Memo

Date: Tuesday, May 02, 2023

To: Tiffany Johnson, Michigan Department of Environment, Great Lake, and Energy

From: Lara Zawaideh, HDR Michigan, Inc.

Subject: Erickson Power Station CCR Units
Closure Work Plan Amendment

In October 2022, Lansing Board of Water & Light (BWL) completed the *Erickson Power Station Forebay, Retention Basin and Clear Water Pond Closure Work Plan (Closure Work Plan)* to close the three active coal combustion residuals (CCR) impoundments located at Erickson Power Station (Erickson, Facility, Site) by removal of CCR. The three CCR impoundments include the Forebay, the Retention Basin, and the Clear Water Pond. The Closure Work Plan (approved version dated January 6, 2023) was submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Materials Management Division (MMD), and was approved on January 17, 2023. This approval of the Closure Work Plan was for removal of the CCR from the impoundments that are regulated solid waste under Part 115, Solid Waste Management of the Natural Resources and Environmental Protection Act, 1994 PA 451.

The Closure Work Plan was approved with the intent to later submit details associated with closure verification objectives or thresholds. These closure verification objectives are proposed herein for approval by EGLE. As described in the Closure Work Plan, physical evidence of the ash removal verification includes soil sampling and analysis confirmation, which requires comparison of concentrations against an analytical closure verification objective. Verification samples will be analyzed and compared to the Michigan Cleanup Criteria Requirements for Response Activity (Part 201 Generic Cleanup Criteria and Screening Levels) (Table 1). However, some constituents of interest (COIs) exceed the cleanup criteria naturally in the soils. Therefore, BWL performed a site-specific background soil study. BWL performed additional background soil sampling, analysis, and statistics and submitted a revised Soil Background Study to EGLE in April 2023. The analytical closure verification objective concentration for each constituent will be the higher concentration of the following (Table 1):

1000 Oakbrook Drive, Suite 2000, Ann Arbor, MI 48108-8949
(734) 761-9130

- Nonresidential Soil Part 201 Generic Cleanup Criteria and Screening Levels for Nonresidential Drinking Water Protection Criteria;
- statewide background soil concentrations, or
- site-specific background soil concentrations.

Table 1 provides the analytical closure verification objective concentration for each constituent/soil type pair as the value bolded.

As an alternative to the soil analytical data verification approach, field microscopic quantification of CCR content may be utilized to confirm the CCR removal objective was met. Should there be nodes within the impoundments where the soil analytical data is not meeting the cleanup standard and the presence of CCR is in question, soil samples will be collected, wet sieved, and reviewed under a Trinocular Microscope (7X-45X zoom magnification) to estimate the visual percent of CCR compared to a Visual Estimate Chart. The procedure was developed from other CCR projects with approved and successfully implemented closure plans in Michigan. The method is described in the Closure Work Plan; however, the microscopy objectives were not provided in the Closure Work Plan and are included herein. To determine what is considered passing or failing the microscopy, a site-specific threshold for CCR removal was selected as a ratio of CCR and native soil that would reduce the concentrations of the materials to less than the nonresidential drinking water protection criteria for soil. The average concentrations from background soils represent 100% native material (or 0% CCR) concentrations (data provided in the Soil Background Study) and were graphed with the average concentrations from 100% CCR ash samples, which will result from three samples of ash collected from each of the impoundments. The ash characterization data is provided in Attachment 1. These concentrations were graphed along with the analytical closure verification objective concentration for each constituent/soil type (Table 1) and graphs are provided in Attachment 2.

To develop the microscopy threshold graphs, constituents were graphed for comparison with the analytical closure verification objective concentrations for each constituent/soil type. Only constituents with ash concentrations (100% CCR) that exceeded the Part 201 Soil Nonresidential Drinking Water Protection Criteria were graphed, including:

- Arsenic
- Boron
- Cobalt
- Fluoride
- Iron
- Lithium
- Molybdenum
- Selenium

Therefore, the following constituents were not graphed:

- Antimony
- Chromium IV
- Sodium

- Barium
- Beryllium
- Cadmium
- Calcium
- Chloride
- Chromium III
- Copper
- Lead
- Magnesium
- Mercury
- Nickel
- Silver
- Sulfate
- Thallium
- Vanadium
- Zinc

The graphs in Attachment 2 are used to determine which constituents are used as indicators of potential groundwater impacts. The site-specific microscopy threshold for CCR removal will be a % CCR viewed under the microscope that would have concentrations less than the respective criteria for soil. For example, if a silty sand is encountered at the bottom of the impoundments, of the constituents, boron has the lowest % CCR as an indicator of potential groundwater impact at 12% CCR. Therefore, for the silty sands to pass the microscopy verification, soil verification samples will need to have less than 12% CCR. Additionally, considering all constituents, clayey sands will need to have less than 11% CCR. Sands with gravel will need to have less than 12% CCR. Sandy clays will need to have less than 10% CCR. Lean clays with gravel/sand will need to have less than 11% CCR (Attachment 2).

As described in the Closure Work Plan, after completion of the removal activities, BWL will submit to EGLE a final certification report that solid waste has been removed along with the supporting documentation and comparison of the physical evidence against the approved closure verification objectives.

Since the Closure Work Plan approval, BWL installed piezometers adjacent to the west side of the Retention Basin and performed an updated assessment of the stability based on measured groundwater elevations for consideration of dewatering requirements for embankment stability. The Retention Basin and Clear Water Pond Seepage and Stability Analyses Memorandum Supplement No 1. (April 19, 2023) is provided as Attachment 3.

Table 1. Background and Comparison Table								
Analyte	**Units**	**Site Specific Background Values (UTLs)**					**Statewide Default Soil Background Level**	**Part 201 Soil Nonresidential Drinking Water Protection Criteria**
		Silty Sand	**Clayey Sand**	**Sand with Gravel**	**Sandy Clay**	**Clay with Gravel/ Sand**		
Antimony	mg/kg	0.5	0.5	0.5	0.6	0.5	NV	**4.3**
Arsenic	mg/kg	**6.66**	**6.05**	**12.6**	**6.17**	3.52	**5.8**	4.6
Barium	mg/kg	81.1	90.4	78.7	241	77.3	75.0	**1,300**
Beryllium	mg/kg	0.58	0.722	0.42	1.03	0.473	NV	**51.0**
Boron	mg/kg	2.19	2.01	2.14	3.03	2.86	NV	**10.0**
Cadmium	mg/kg	0.74	0.48	0.2	0.33	0.2	1.2	**6.0**
Calcium	mg/kg	50,800	160,00	47,600	175,00	151,000	NV	NV
Chloride	mg/kg	81.0	68.0	82.0	71.0	66.0	NV	**5,000**
Chromium (Total)	mg/kg	15.8	13.1	87.2	24.6	13.1	NV	NV
Chromium III	mg/kg	14.1	13.1	87.2	24.6	13.1	18.0	**100,000**
Chromium VI	mg/kg	5.0	1.0	1.24	1.0	1.0	NV	**30.0**
Cobalt	mg/kg	**14.5**	**10.5**	**10.7**	**13.2**	**8.73**	6.8	2.0
Copper	mg/kg	30.0	28.4	143	22.5	12.6	32.0	**5,800**
Fluoride	mg/kg	16.0	15.0	16.0	16.0	13.0	NV	**40.0**
Iron	mg/kg	**17,700**	**16,100**	**19,200**	**22,200**	**14,400**	12,000	6.0
Lead	mg/kg	16.6	14.6	12.2	12.4	8.51	21.0	**700**
Lithium	mg/kg	**7.12**	9.73	**19.6**	**12.6**	**11.0**	**9.8**	7.0
Magnesium	mg/kg	17,700	18,500	16,800	**67,900**	**28,900**	NV	**22,000**
Mercury	mg/kg	0.059	0.095	0.131	0.059	0.096	0.13	**1.70**
Molybdenum	mg/kg	0.5	0.78	0.63	1.95	1.14	NV	**4.20**
Nickel	mg/kg	27.5	23.6	26.9	28.8	19.9	20.0	**100**
Potassium	mg/kg	488	653	1,500	1,290	968	NV	NV
Selenium	mg/kg	1.0	0.71	1.0	2.5	2.5	0.41	**4.0**
Silver	mg/kg	0.2	0.2	0.2	0.2	0.2	1.0	**13.0**
Sodium	mg/kg	112	275	122	180	202	NV	**7,000**
Sulfate	mg/kg	250	77.0	123	248	219	NV	**5,000**
Thallium	mg/kg	0.2	0.2	0.2	0.2	0.2	NV	**2.3**
Total Solids	mg/kg	92.7	88	90.8	83	92	NV	NV
Vanadium	mg/kg	21.8	20.5	31.1	34.4	19.5	NV	**990**
Zinc	mg/kg	46.0	49.5	82.1	57.4	27.4	47.0	**5,000**

Bold values are the highest concentrations and represent the closure verification objective concentration for each constituent/soil type. For example, for arsenic, the closure verification objective concentrations for silty sands, clayey sands, sands with gravel, and sandy clays are the site-specific background values for each soil type, and for clays with gravel/sand the statewide default soil background level will be the closure verification objective concentration.

Attachment 1

Ash Characterization Data

Lansing Board of Water and Light
Environmental Services Laboratory (MI00079)
1232 Haco Dr.
Lansing, Michigan 48901

15 September 2022

BWL - Erickson Station

Attn: Cheryl Louden

3725 S. Canal

Lansing, MI 48917

Project: Erickson Closure Verification

Dear Cheryl Louden,

Enclosed is a copy of the laboratory report for the following work order(s) received by Lansing Board of Water and Light Environmental Services Laboratory:

Work Order	Received	Account Number
L209189	9/8/2022 1:37:00PM	

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Caporale

Jennifer Caporale, Supervisor

Analytical Laboratory Report

Report ID: S40124.01(01)
Generated on 09/14/2022

Report to

Attention: Jennifer Caporale
Board of Water & Light
P.O. Box 13007
Lansing, MI 48901

Phone: 517-702-6372 FAX:
Email: Environmental_Laboratory@LBWL.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S40124.01-S40124.03
Project: Erickson Closure Verification
Collected Date(s): 09/09/2022
Submitted Date/Time: 09/09/2022 12:25
Sampled by: Bryce/Molly
P.O. #:

Table of Contents

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1 (1993)
SM2540B	Standard Method 2540 B 2015
SW3050B	SW 846 Method 3050B Revision 2 December 1996
SW6020A	SW 846 Method 6020A Revision 1 February 2007
SW7196A	SW 846 Method 7196A Revision 1 July 1992/SW 846 Method 3060A Revision 1 December 1996
SW7471B	SW 846 Method 7471B Revision 2 February 2007

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S40124.01	Forebay Ash A	Sludge	09/09/22 10:45
S40124.02	Forebay Ash B	Sludge	09/09/22 10:47
S40124.03	Forebay Ash C	Sludge	09/09/22 10:48

Analytical Laboratory Report

Lab Sample ID: S40124.01
Sample Tag: Forebay Ash A
Collected Date/Time: 09/09/2022 10:45
Matrix: Sludge
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	8oz Glass	None	Yes	24.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	09/12/22 09:45	JRH	
Mercury Digestion	Completed	SW7471B	09/13/22 12:28	CTV	

Inorganics

Method: E300.0, Run Date: 09/14/22 07:55, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	325	232	3.7	mg/kg	232	16887-00-6	
Fluoride (Undistilled)*	Not detected	46	6.0	mg/kg	232	16984-48-8	
Sulfate*	Not detected	232	14	mg/kg	232	14808-79-8	

Method: SM2540B, Run Date: 09/12/22 15:41, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	22	1	1	%	1		

Method: SW7196A, Run Date: 09/14/22 11:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 09/14/22 16:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	52.3	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 09/12/22 12:58, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	1.0	0.12	mg/kg	668	7440-36-0	
Arsenic	16.8	0.20	0.022	mg/kg	668	7440-38-2	
Barium	2,690	1.0	0.016	mg/kg	668	7440-39-3	
Beryllium	1.50	0.20	0.033	mg/kg	668	7440-41-7	
Boron	150	2.0	0.60	mg/kg	668	7440-42-8	
Cadmium	2.61	0.20	0.021	mg/kg	668	7440-43-9	
Chromium	52.3	0.50	0.027	mg/kg	668	7440-47-3	
Cobalt	8.63	0.50	0.022	mg/kg	668	7440-48-4	
Copper	151	0.50	0.042	mg/kg	668	7440-50-8	
Iron	15,400	2.0	0.14	mg/kg	668	7439-89-6	
Lead	15.0	0.30	0.015	mg/kg	668	7439-92-1	
Lithium	22.8	0.20	0.12	mg/kg	668	7439-93-2	
Molybdenum	2.61	1.0	0.032	mg/kg	668	7439-98-7	
Nickel	22.1	0.50	0.051	mg/kg	668	7440-02-0	
Selenium	1.76	1.0	0.28	mg/kg	668	7782-49-2	
Silver	Not detected	0.20	0.011	mg/kg	668	7440-22-4	
Thallium	0.97	0.20	0.013	mg/kg	668	7440-28-0	

Lab Sample ID: S40124.01 (continued)
Sample Tag: Forebay Ash A

Method: SW6020A, Run Date: 09/12/22 12:58, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Vanadium	118	0.50	0.023	mg/kg	668	7440-62-2	
Zinc	88.2	1.0	0.13	mg/kg	668	7440-66-6	

Method: SW6020A, Run Date: 09/12/22 15:25, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	88,400	50	2.4	mg/kg	668	7440-70-2	
Magnesium	16,600	50	0.14	mg/kg	668	7439-95-4	
Potassium	720	50	1.6	mg/kg	668	7440-09-7	
Sodium	2,860	50	0.73	mg/kg	668	7440-23-5	

Method: SW7471B, Run Date: 09/13/22 13:38, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0029	mg/kg	150	7439-97-6	

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Analytical Laboratory Report

Lab Sample ID: S40124.02
Sample Tag: Forebay Ash B
Collected Date/Time: 09/09/2022 10:47
Matrix: Sludge
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	8oz Glass	None	Yes	24.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	09/12/22 09:45	JRH	
Mercury Digestion	Completed	SW7471B	09/13/22 12:28	CTV	

Inorganics

Method: E300.0, Run Date: 09/14/22 08:08, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	467	316	5.0	mg/kg	316	16887-00-6	
Fluoride (Undistilled)*	Not detected	63	8.2	mg/kg	316	16984-48-8	
Sulfate*	543	316	19	mg/kg	316	14808-79-8	

Method: SM2540B, Run Date: 09/12/22 15:41, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	18	1	1	%	1		

Method: SW7196A, Run Date: 09/14/22 12:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 09/14/22 16:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	61.2	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 09/12/22 13:06, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	1.0	0.13	mg/kg	747	7440-36-0	
Arsenic	17.9	0.20	0.025	mg/kg	747	7440-38-2	
Barium	1,980	1.0	0.018	mg/kg	747	7440-39-3	
Beryllium	1.20	0.20	0.037	mg/kg	747	7440-41-7	
Boron	125	2.0	0.67	mg/kg	747	7440-42-8	
Cadmium	1.57	0.20	0.024	mg/kg	747	7440-43-9	
Chromium	61.2	0.50	0.030	mg/kg	747	7440-47-3	
Cobalt	7.69	0.50	0.025	mg/kg	747	7440-48-4	
Copper	153	0.50	0.046	mg/kg	747	7440-50-8	
Iron	13,000	2.0	0.16	mg/kg	747	7439-89-6	
Lead	14.6	0.30	0.016	mg/kg	747	7439-92-1	
Lithium	23.9	0.20	0.14	mg/kg	747	7439-93-2	
Molybdenum	3.40	1.0	0.036	mg/kg	747	7439-98-7	
Nickel	20.2	0.50	0.057	mg/kg	747	7440-02-0	
Selenium	1.86	1.0	0.31	mg/kg	747	7782-49-2	
Silver	Not detected	0.20	0.012	mg/kg	747	7440-22-4	
Thallium	0.58	0.20	0.014	mg/kg	747	7440-28-0	

Lab Sample ID: S40124.02 (continued)

Sample Tag: Forebay Ash B

Method: SW6020A, Run Date: 09/12/22 13:06, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Vanadium	111	0.50	0.026	mg/kg	747	7440-62-2	
Zinc	78.7	1.0	0.14	mg/kg	747	7440-66-6	

Method: SW6020A, Run Date: 09/12/22 15:26, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	69,600	50	2.7	mg/kg	747	7440-70-2	
Magnesium	21,300	50	0.16	mg/kg	747	7439-95-4	
Potassium	627	50	1.8	mg/kg	747	7440-09-7	
Sodium	2,550	50	0.81	mg/kg	747	7440-23-5	

Method: SW7471B, Run Date: 09/13/22 13:41, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0037	mg/kg	190	7439-97-6	

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Analytical Laboratory Report

Lab Sample ID: S40124.03
Sample Tag: Forebay Ash C
Collected Date/Time: 09/09/2022 10:48
Matrix: Sludge
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	8oz Glass	None	Yes	24.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	09/12/22 09:45	JRH	
Mercury Digestion	Completed	SW7471B	09/13/22 12:28	CTV	

Inorganics

Method: E300.0, Run Date: 09/14/22 08:21, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	432	288	4.6	mg/kg	288	16887-00-6	
Fluoride (Undistilled)*	Not detected	58	7.5	mg/kg	288	16984-48-8	
Sulfate*	357	288	17	mg/kg	288	14808-79-8	

Method: SM2540B, Run Date: 09/12/22 15:41, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	19	1	1	%	1		

Method: SW7196A, Run Date: 09/14/22 12:05, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 09/14/22 16:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	62.8	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 09/12/22 13:12, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	1.0	0.12	mg/kg	684	7440-36-0	
Arsenic	20.6	0.20	0.023	mg/kg	684	7440-38-2	
Barium	1,840	1.0	0.016	mg/kg	684	7440-39-3	
Beryllium	1.07	0.20	0.034	mg/kg	684	7440-41-7	
Boron	123	2.0	0.62	mg/kg	684	7440-42-8	
Cadmium	2.18	0.20	0.022	mg/kg	684	7440-43-9	
Chromium	62.8	0.50	0.028	mg/kg	684	7440-47-3	
Cobalt	7.37	0.50	0.023	mg/kg	684	7440-48-4	
Copper	138	0.50	0.043	mg/kg	684	7440-50-8	
Iron	12,000	2.0	0.15	mg/kg	684	7439-89-6	
Lead	13.4	0.30	0.015	mg/kg	684	7439-92-1	
Lithium	26.1	0.20	0.13	mg/kg	684	7439-93-2	
Molybdenum	3.18	1.0	0.033	mg/kg	684	7439-98-7	
Nickel	20.0	0.50	0.052	mg/kg	684	7440-02-0	
Selenium	1.93	1.0	0.29	mg/kg	684	7782-49-2	
Silver	Not detected	0.20	0.011	mg/kg	684	7440-22-4	
Thallium	0.66	0.20	0.013	mg/kg	684	7440-28-0	

Lab Sample ID: S40124.03 (continued)

Sample Tag: Forebay Ash C

Method: SW6020A, Run Date: 09/12/22 13:12, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Vanadium	116	0.50	0.024	mg/kg	684	7440-62-2	
Zinc	75.4	1.0	0.13	mg/kg	684	7440-66-6	

Method: SW6020A, Run Date: 09/12/22 15:27, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	90,600	50	2.5	mg/kg	684	7440-70-2	
Magnesium	24,400	50	0.15	mg/kg	684	7439-95-4	
Potassium	549	50	1.6	mg/kg	684	7440-09-7	
Sodium	2,060	50	0.75	mg/kg	684	7440-23-5	

Method: SW7471B, Run Date: 09/13/22 13:45, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0031	mg/kg	163	7439-97-6	

Merit Laboratories Login Checklist

Lab Set ID: S40124
Client: BWL01 (Board of Water & Light)
Project: Erickson Closure Verification
Submitted: 09/09/2022 12:25 Login User: BJB

Attention: Jennifer Caporale
Address: Board of Water & Light
P.O. Box 13007
Lansing, MI 48901

Phone: 517-702-6372 FAX:
Email: Environmental_Laboratory@LBWL.com

Selection				Description	Note
Sample Receiving					
01.	☐ Yes	☐ No	☒ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 24.3
02.	☒ Yes	☐ No	☐ N/A	Received on ice/ cooling process begun	
03.	☐ Yes	☒ No	☐ N/A	Samples shipped	
04.	☐ Yes	☒ No	☐ N/A	Samples left in 24 hr. drop box	
05.	☐ Yes	☐ No	☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	☒ Yes	☐ No	☐ N/A	COC adequately filled out	
07.	☒ Yes	☐ No	☐ N/A	COC signed and relinquished to the lab	
08.	☒ Yes	☐ No	☐ N/A	Sample tag on bottles match COC	
09.	☐ Yes	☒ No	☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	☒ Yes	☐ No	☐ N/A	Do sample have correct chemical preservation	
11.	☐ Yes	☐ No	☒ N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	☐ Yes	☒ No	☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	☒ Yes	☐ No	☐ N/A	All bottles intact	
14.	☒ Yes	☐ No	☐ N/A	Appropriate analytical bottles are used	
15.	☒ Yes	☐ No	☐ N/A	Merit bottles used	
16.	☒ Yes	☐ No	☐ N/A	Sufficient sample volume received	
17.	☐ Yes	☒ No	☐ N/A	Samples require laboratory filtration	
18.	☒ Yes	☐ No	☐ N/A	Samples submitted within holding time	
19.	☐ Yes	☐ No	☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Jennifer Caporale
COMPANY: Lansing Board of Water & Light
ADDRESS: PO Box 13007
CITY: Lansing | STATE: MI | ZIP CODE: 48901
PHONE NO.: 517-702-6372 | FAX NO.: | P.O. NO.:
E-MAIL ADDRESS: Environmental_Laboratory@lbwl.com | QUOTE NO.:

INVOICE TO

CONTACT NAME: Kelly Gleason ☒ SAME
COMPANY:
ADDRESS:
CITY: | STATE: | ZIP CODE:
PHONE NO.: | E-MAIL ADDRESS: Kelly.Gleason@lbwl.com

PROJECT NO./NAME: Erickson Closure Verification
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Bryce / Molly
TURNAROUND TIME REQUIRED ☒ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☐ STANDARD ☒ OTHER ASAP
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☒ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☒ NPDES
Project Locations
☐ Detroit ☐ New York
☐ Other
Special Instructions: L209189

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	Chloride, Fluoride, Sulfate	Total Solids	Chromium VI	Mercury	Metals (see attached list)
40124.01	9-9-22	1045	Forebay Ash A	SL	1	/											
.02	9-9-22	1047	Forebay Ash B	SL	1	/											
.03	9-9-22	1048	Forebay Ash C	SL	1	/											

RELINQUISHED BY: SIGNATURE/ORGANIZATION ☐ Sampler DATE 9/9/22 TIME 12:35
RECEIVED BY: SIGNATURE/ORGANIZATION DATE 9/9/22 TIME 1235
RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME

SEAL NO. | SEAL INTACT YES ☐ NO ☐ | INITIALS
SEAL NO. | SEAL INTACT YES ☐ NO ☐ | INITIALS

NOTES: TEMP. ON ARRIVAL 24.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

Lansing Board of Water and Light
Environmental Services Laboratory (MI00079)
Cert ID: 3760
1232 Haco Dr.
Lansing, Michigan 48901

07 March 2023

BWL - Erickson Station

Attn: Cheryl Louden

3725 S. Canal

Lansing, MI 48917

Project: Erickson Closure Ash Characterization

Dear Cheryl Louden,

Enclosed is a copy of the laboratory report for the following work order(s) received by Lansing Board of Water and Light Environmental Services Laboratory:

Work Order	Received	Account Number
L301211	1/26/2023 12:35:00PM	

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Caporale

Jennifer Caporale, Supervisor

Analytical Laboratory Report

Final Report

Report ID: S44784.01(02)
Generated on 03/06/2023
Replaces report S44784.01(01) generated on 01/30/2023

Report to

Attention: Jennifer Caporale
Board of Water & Light
P.O. Box 13007
Lansing, MI 48901

Phone: 517-702-6372 FAX:
Email: Environmental_Laboratory@LBWL.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S44784.01-S44784.06
Project: Erickson Closure Ash Charaterization
Collected Date(s): 01/20/2023
Submitted Date/Time: 01/26/2023 15:45
Sampled by: HDR
P.O. #:

Table of Contents

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
When MDL results are provided, then 'Not detected' indicates that parameter was not found at a level equal to or greater than the MDL.
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile, and 2-chloroethylvinyl ether need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."
Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.
Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

All analyses completed

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1 (1993)
SM2540B	Standard Method 2540 B 2015
SW3050B	SW 846 Method 3050B Revision 2 December 1996
SW6020A	SW 846 Method 6020A Revision 1 February 2007
SW7196A	SW 846 Method 7196A Revision 1 July 1992/SW 846 Method 3060A Revision 1 December 1996
SW7471B	SW 846 Method 7471B Revision 2 February 2007

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S44784.01	Retention Basin A L301211-01	Soil	01/20/23 11:00
S44784.02	Retention Basin B L301211-02	Soil	01/20/23 11:00
S44784.03	Retention Basin C L301211-03	Soil	01/20/23 11:00
S44784.04	Clearwater Pond A L301211-04	Soil	01/20/23 11:30
S44784.05	Clearwater Pond B L301211-05	Soil	01/20/23 11:30
S44784.06	Clearwater Pond C L301211-06	Soil	01/20/23 11:30

Lab Sample ID: S44784.01
Sample Tag: Retention Basin A L301211-01
Collected Date/Time: 01/20/2023 11:00
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 10:25, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	99	87	1.1	mg/kg	87	16887-00-6	
Fluoride (Undistilled)*	Not detected	17	1.4	mg/kg	87	16984-48-8	
Sulfate*	280	87	9.0	mg/kg	87	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	42	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:15, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:15, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	32.7	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 11:28, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	9,210	28	5.9	mg/kg	28000	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 11:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.50	0.049	mg/kg	280	7440-36-0	
Arsenic	9.11	0.20	0.0092	mg/kg	280	7440-38-2	
Barium	184	1.0	0.0067	mg/kg	280	7440-39-3	
Beryllium	0.24	0.20	0.014	mg/kg	280	7440-41-7	
Boron	22.3	2.0	0.25	mg/kg	280	7440-42-8	
Cadmium	0.34	0.20	0.0090	mg/kg	280	7440-43-9	
Chromium	32.7	0.50	0.011	mg/kg	280	7440-47-3	
Cobalt	4.44	0.50	0.0092	mg/kg	280	7440-48-4	
Copper	22.7	0.50	0.017	mg/kg	280	7440-50-8	
Lead	8.48	0.30	0.0062	mg/kg	280	7439-92-1	
Lithium	13.3	0.20	0.051	mg/kg	280	7439-93-2	
Molybdenum	7.06	0.50	0.014	mg/kg	280	7439-98-7	
Nickel	11.5	0.50	0.021	mg/kg	280	7440-02-0	

Lab Sample ID: S44784.01 (continued)

Sample Tag: Retention Basin A L301211-01

Method: SW6020A, Run Date: 01/30/23 11:30, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	0.80	0.40	0.12	mg/kg	280	7782-49-2	
Silver	Not detected	0.20	0.0046	mg/kg	280	7440-22-4	
Thallium	0.23	0.20	0.0053	mg/kg	280	7440-28-0	
Vanadium	39.4	0.50	0.0098	mg/kg	280	7440-62-2	
Zinc	37.3	0.50	0.053	mg/kg	280	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:34, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	85,100	2,275	100	mg/kg	28000	7440-70-2	
Magnesium	18,400	2,275	5.9	mg/kg	28000	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:02, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	454	25	0.67	mg/kg	280	7440-09-7	
Sodium	280	25	0.31	mg/kg	280	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 15:56, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0028	mg/kg	144	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:06, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S44784.02
Sample Tag: Retention Basin B L301211-02
Collected Date/Time: 01/20/2023 11:00
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 10:35, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	64	51	0.7	mg/kg	51	16887-00-6	
Fluoride (Undistilled)*	Not detected	10	0.8	mg/kg	51	16984-48-8	
Sulfate*	195	51	5.3	mg/kg	51	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	65	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	13.7	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 11:36, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	6,330	16	3.4	mg/kg	15900	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 11:38, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.50	0.028	mg/kg	159	7440-36-0	
Arsenic	4.89	0.20	0.0052	mg/kg	159	7440-38-2	
Barium	101	1.0	0.0038	mg/kg	159	7440-39-3	
Beryllium	Not detected	0.20	0.0078	mg/kg	159	7440-41-7	
Boron	10.6	2.0	0.14	mg/kg	159	7440-42-8	
Cadmium	Not detected	0.20	0.0051	mg/kg	159	7440-43-9	
Chromium	13.7	0.50	0.0064	mg/kg	159	7440-47-3	
Cobalt	3.17	0.50	0.0052	mg/kg	159	7440-48-4	
Copper	10.7	0.50	0.0099	mg/kg	159	7440-50-8	
Lead	3.96	0.30	0.0035	mg/kg	159	7439-92-1	
Lithium	8.17	0.20	0.029	mg/kg	159	7439-93-2	
Molybdenum	3.59	0.50	0.0077	mg/kg	159	7439-98-7	
Nickel	8.40	0.50	0.012	mg/kg	159	7440-02-0	

Lab Sample ID: S44784.02 (continued)

Sample Tag: Retention Basin B L301211-02

Method: SW6020A, Run Date: 01/30/23 11:38, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	0.52	0.40	0.067	mg/kg	159	7782-49-2	
Silver	Not detected	0.20	0.0026	mg/kg	159	7440-22-4	
Thallium	Not detected	0.20	0.0030	mg/kg	159	7440-28-0	
Vanadium	18.0	0.50	0.0056	mg/kg	159	7440-62-2	
Zinc	19.1	0.50	0.030	mg/kg	159	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:35, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	53,400	2,275	57	mg/kg	15900	7440-70-2	
Magnesium	12,100	2,275	3.4	mg/kg	15900	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:21, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	330	25	0.76	mg/kg	318	7440-09-7	
Sodium	144	25	0.34	mg/kg	318	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 15:59, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0012	mg/kg	61	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:06, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S44784.03
Sample Tag: Retention Basin C L301211-03
Collected Date/Time: 01/20/2023 11:00
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 10:45, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	308	143	1.8	mg/kg	143	16887-00-6	
Fluoride (Undistilled)*	Not detected	28	2.3	mg/kg	143	16984-48-8	
Sulfate*	790	143	15	mg/kg	143	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	24	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:25, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	71.0	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 11:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	6,520	46	9.6	mg/kg	45500	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 11:44, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.50	0.080	mg/kg	455	7440-36-0	
Arsenic	11.5	0.20	0.015	mg/kg	455	7440-38-2	
Barium	472	1.0	0.011	mg/kg	455	7440-39-3	
Beryllium	0.22	0.20	0.022	mg/kg	455	7440-41-7	
Boron	56.8	2.0	0.41	mg/kg	455	7440-42-8	
Cadmium	0.48	0.20	0.015	mg/kg	455	7440-43-9	
Chromium	71.0	0.50	0.018	mg/kg	455	7440-47-3	
Cobalt	2.80	0.50	0.015	mg/kg	455	7440-48-4	
Copper	37.4	0.50	0.028	mg/kg	455	7440-50-8	
Lead	4.67	0.30	0.010	mg/kg	455	7439-92-1	
Lithium	13.9	0.20	0.083	mg/kg	455	7439-93-2	
Molybdenum	11.6	0.50	0.022	mg/kg	455	7439-98-7	
Nickel	9.78	0.50	0.035	mg/kg	455	7440-02-0	

Lab Sample ID: S44784.03 (continued)

Sample Tag: Retention Basin C L301211-03

Method: SW6020A, Run Date: 01/30/23 11:44, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	1.69	0.40	0.19	mg/kg	455	7782-49-2	
Silver	Not detected	0.20	0.0074	mg/kg	455	7440-22-4	
Thallium	0.20	0.20	0.0086	mg/kg	455	7440-28-0	
Vanadium	54.0	0.50	0.016	mg/kg	455	7440-62-2	
Zinc	32.0	1.0	0.086	mg/kg	455	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:37, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	94,500	2,275	160	mg/kg	45500	7440-70-2	
Magnesium	16,500	2,275	9.6	mg/kg	45500	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:04, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	300	25	1.1	mg/kg	455	7440-09-7	
Sodium	688	25	0.50	mg/kg	455	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 16:02, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.050	0.0039	mg/kg	203	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:07, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S44784.04
Sample Tag: Clearwater Pond A L301211-04
Collected Date/Time: 01/20/2023 11:30
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 10:55, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	264	135	1.8	mg/kg	135	16887-00-6	
Fluoride (Undistilled)*	Not detected	27	2.2	mg/kg	135	16984-48-8	
Sulfate*	569	135	14	mg/kg	135	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	27	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	205	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 11:48, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Barium	1,610	4.0	0.94	mg/kg	39100	7440-39-3	
Iron	16,200	40	8.3	mg/kg	39100	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 11:50, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	4.22	0.50	0.068	mg/kg	391	7440-36-0	
Arsenic	161	0.20	0.013	mg/kg	391	7440-38-2	
Beryllium	11.5	0.20	0.019	mg/kg	391	7440-41-7	
Boron	48.7	2.0	0.35	mg/kg	391	7440-42-8	
Cadmium	2.81	0.20	0.013	mg/kg	391	7440-43-9	
Chromium	205	0.50	0.016	mg/kg	391	7440-47-3	
Cobalt	28.6	0.50	0.013	mg/kg	391	7440-48-4	
Copper	447	0.50	0.024	mg/kg	391	7440-50-8	
Lead	45.5	0.30	0.0086	mg/kg	391	7439-92-1	
Lithium	22.0	0.20	0.072	mg/kg	391	7439-93-2	
Molybdenum	87.2	0.50	0.019	mg/kg	391	7439-98-7	
Nickel	67.1	0.50	0.030	mg/kg	391	7440-02-0	

Lab Sample ID: S44784.04 (continued)

Sample Tag: Clearwater Pond A L301211-04

Method: SW6020A, Run Date: 01/30/23 11:50, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	83.1	0.40	0.16	mg/kg	391	7782-49-2	
Silver	Not detected	0.20	0.0064	mg/kg	391	7440-22-4	
Thallium	4.68	0.20	0.0074	mg/kg	391	7440-28-0	
Vanadium	594	0.50	0.014	mg/kg	391	7440-62-2	
Zinc	173	0.80	0.074	mg/kg	391	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:38, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	17,500	2,275	140	mg/kg	39100	7440-70-2	
Magnesium	2,860	15	8.3	mg/kg	39100	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:06, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	1,090	25	0.94	mg/kg	391	7440-09-7	
Sodium	723	25	0.43	mg/kg	391	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 16:06, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.176	0.050	0.0039	mg/kg	204	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:08, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S44784.05
Sample Tag: Clearwater Pond B L301211-05
Collected Date/Time: 01/20/2023 11:30
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 11:05, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	194	90	1.2	mg/kg	90	16887-00-6	
Fluoride (Undistilled)*	Not detected	18	1.4	mg/kg	90	16984-48-8	
Sulfate*	567	90	9.4	mg/kg	90	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	37	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:35, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	86.6	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 11:55, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	10,000	26	5.5	mg/kg	25800	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 11:57, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	0.58	0.50	0.045	mg/kg	258	7440-36-0	
Arsenic	47.1	0.20	0.0085	mg/kg	258	7440-38-2	
Barium	722	1.0	0.0062	mg/kg	258	7440-39-3	
Beryllium	2.58	0.20	0.013	mg/kg	258	7440-41-7	
Boron	40.9	2.0	0.23	mg/kg	258	7440-42-8	
Cadmium	1.93	0.20	0.0083	mg/kg	258	7440-43-9	
Chromium	86.6	0.50	0.010	mg/kg	258	7440-47-3	
Cobalt	15.0	0.50	0.0085	mg/kg	258	7440-48-4	
Copper	129	0.50	0.016	mg/kg	258	7440-50-8	
Lead	14.3	0.30	0.0057	mg/kg	258	7439-92-1	
Lithium	24.5	0.20	0.047	mg/kg	258	7439-93-2	
Molybdenum	37.9	0.50	0.012	mg/kg	258	7439-98-7	
Nickel	33.5	0.50	0.020	mg/kg	258	7440-02-0	

Lab Sample ID: S44784.05 (continued)

Sample Tag: Clearwater Pond B L301211-05

Method: SW6020A, Run Date: 01/30/23 11:57, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	14.1	0.40	0.11	mg/kg	258	7782-49-2	
Silver	Not detected	0.20	0.0042	mg/kg	258	7440-22-4	
Thallium	2.21	0.20	0.0049	mg/kg	258	7440-28-0	
Vanadium	115	0.50	0.0090	mg/kg	258	7440-62-2	
Zinc	99.5	0.50	0.049	mg/kg	258	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:39, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	51,600	2,275	93	mg/kg	25800	7440-70-2	
Magnesium	13,600	2,275	5.5	mg/kg	25800	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:07, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	624	25	0.62	mg/kg	258	7440-09-7	
Sodium	568	25	0.28	mg/kg	258	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 16:09, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.050	0.050	0.0023	mg/kg	118	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:08, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S44784.06
Sample Tag: Clearwater Pond C L301211-06
Collected Date/Time: 01/20/2023 11:30
Matrix: Soil
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Plastic Bag	None	No	RT	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3050B	01/30/23 10:05	JRH	
Mercury Digestion	Completed	SW7471B	01/27/23 13:18	CTV	

Inorganics

Method: E300.0, Run Date: 01/30/23 11:15, Analyst: JDP

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloride*	150	75	1.0	mg/kg	75	16887-00-6	
Fluoride (Undistilled)*	Not detected	15	1.2	mg/kg	75	16984-48-8	
Sulfate*	630	75	7.8	mg/kg	75	14808-79-8	

Method: SM2540B, Run Date: 01/27/23 15:23, Analyst: MAM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	42	1	1	%	1		

Method: SW7196A, Run Date: 01/30/23 14:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium VI	Not detected	2	1.2	mg/kg	200	18540-29-9	

Metals

Method: SW6020A, Run Date: 01/30/23 14:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium III	83	2.0	1.2	mg/kg	200	16065-83-1	

Method: SW6020A, Run Date: 01/30/23 12:01, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Barium	1,070	2.3	0.53	mg/kg	22100	7440-39-3	
Iron	11,500	23	4.7	mg/kg	22100	7439-89-6	

Method: SW6020A, Run Date: 01/30/23 12:03, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	1.29	0.50	0.039	mg/kg	221	7440-36-0	
Arsenic	66.1	0.20	0.0073	mg/kg	221	7440-38-2	
Beryllium	6.97	0.20	0.011	mg/kg	221	7440-41-7	
Boron	44.6	2.0	0.20	mg/kg	221	7440-42-8	
Cadmium	1.32	0.20	0.0071	mg/kg	221	7440-43-9	
Chromium	83.0	0.50	0.0089	mg/kg	221	7440-47-3	
Cobalt	22.4	0.50	0.0073	mg/kg	221	7440-48-4	
Copper	172	0.50	0.014	mg/kg	221	7440-50-8	
Lead	17.4	0.30	0.0049	mg/kg	221	7439-92-1	
Lithium	13.0	0.20	0.040	mg/kg	221	7439-93-2	
Molybdenum	16.1	0.50	0.011	mg/kg	221	7439-98-7	
Nickel	46.8	0.50	0.017	mg/kg	221	7440-02-0	

Lab Sample ID: S44784.06 (continued)

Sample Tag: Clearwater Pond C L301211-06

Method: SW6020A, Run Date: 01/30/23 12:03, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Selenium	14.4	0.40	0.093	mg/kg	221	7782-49-2	
Silver	Not detected	0.20	0.0036	mg/kg	221	7440-22-4	
Thallium	1.89	0.20	0.0042	mg/kg	221	7440-28-0	
Vanadium	156	0.50	0.0077	mg/kg	221	7440-62-2	
Zinc	94.3	0.50	0.042	mg/kg	221	7440-66-6	

Method: SW6020A, Run Date: 01/30/23 13:40, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium	56,700	2,275	80	mg/kg	22100	7440-70-2	
Magnesium	8,040	2,275	4.7	mg/kg	22100	7439-95-4	

Method: SW6020A, Run Date: 01/30/23 14:08, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Potassium	757	25	0.53	mg/kg	221	7440-09-7	
Sodium	936	25	0.24	mg/kg	221	7440-23-5	

Method: SW7471B, Run Date: 01/27/23 16:12, Analyst: CTV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.083	0.050	0.0021	mg/kg	108	7439-97-6	

Other / Misc.

Method: , Run Date: 02/28/23 05:20, Analyst: GEL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Radiological Analyses*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Merit Laboratories Login Checklist

Lab Set ID: S44784
Client: BWL01 (Board of Water & Light)
Project: Erickson Closure Ash Charaterization
Submitted: 01/26/2023 15:45 Login User: MMC

Attention: Jennifer Caporale
Address: Board of Water & Light
P.O. Box 13007
Lansing, MI 48901

Phone: 517-702-6372 FAX:
Email: Environmental_Laboratory@LBWL.com

Selection				Description	Note
Sample Receiving					
01.	☐ Yes	☐ No	☒ N/A	Samples are received at 4C +/- 2C Thermometer #	RT
02.	☐ Yes	☒ No	☐ N/A	Received on ice/ cooling process begun	
03.	☐ Yes	☒ No	☐ N/A	Samples shipped	
04.	☐ Yes	☒ No	☐ N/A	Samples left in 24 hr. drop box	
05.	☐ Yes	☐ No	☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	☒ Yes	☐ No	☐ N/A	COC adequately filled out	
07.	☒ Yes	☐ No	☐ N/A	COC signed and relinquished to the lab	
08.	☒ Yes	☐ No	☐ N/A	Sample tag on bottles match COC	
09.	☒ Yes	☐ No	☐ N/A	Subcontracting needed? Subcontacted to:	GEL
Preservation					
10.	☒ Yes	☐ No	☐ N/A	Do sample have correct chemical preservation	
11.	☐ Yes	☐ No	☒ N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	☐ Yes	☒ No	☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	☒ Yes	☐ No	☐ N/A	All bottles intact	
14.	☒ Yes	☐ No	☐ N/A	Appropriate analytical bottles are used	
15.	☒ Yes	☐ No	☐ N/A	Merit bottles used	
16.	☒ Yes	☐ No	☐ N/A	Sufficient sample volume received	
17.	☐ Yes	☒ No	☐ N/A	Samples require laboratory filtration	
18.	☒ Yes	☐ No	☐ N/A	Samples submitted within holding time	
19.	☐ Yes	☐ No	☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Jennifer Caporale
COMPANY: Lansing Board of Water & Light
ADDRESS: PO Box 13007
CITY: Lansing | STATE: MI | ZIP CODE: 48901
PHONE NO.: 517-702-6372 | FAX NO.: | P.O. NO.:
E-MAIL ADDRESS: Environmental_Laboratory@lbwl.com | QUOTE NO.:

INVOICE TO

CONTACT NAME: Beth Zimpfer ☒SAME
COMPANY:
ADDRESS:
CITY: | STATE: | ZIP CODE:
PHONE NO.: | E-MAIL ADDRESS: Beth.Zimpfer@lbwl.com

PROJECT NO./NAME: L301211 Erickson Closure Ash Charaterization
SAMPLER(S) - PLEASE PRINT/SIGN NAME: HDR

TURNAROUND TIME REQUIRED ☒1 DAY ☐2 DAYS ☐3 DAYS ☐STANDARD ☒OTHER ASAP

DELIVERABLES REQUIRED ☐STD ☐LEVEL II ☒LEVEL III ☐LEVEL IV ☒EDD ☐OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications: ☐OHIO VAP ☐Drinking Water ☐DoD ☒NPDES
Project Locations: ☐Detroit ☐New York ☐Other
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	Chloride, Fluoride, Sulfate	Total Solids	Chromium VI & III	Mercury	Metals (see attached list)	Radium 226 & 228
44784.01	01/20/23	1100	Retention Basin A L301211-01	S		1							✓	✓	✓	✓	✓	✓
.02			Retention Basin B -02	S									✓	✓	✓	✓	✓	✓
.03			Retention Basin C -03	S									✓	✓	✓	✓	✓	✓
.04		1130	Clearwater Pond A -04	S									✓	✓	✓	✓	✓	✓
.05			Clearwater Pond B -05	S									✓	✓	✓	✓	✓	✓
.06			Clearwater Pond C -06	S									✓	✓	✓	✓	✓	✓

See Quote ID 221221-01

RELINQUISHED BY: SIGNATURE/ORGANIZATION	☐Sampler	DATE 1.26.23	TIME 1545
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 1/26/23	TIME 1545
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

SEAL NO. | SEAL INTACT YES☐ NO☐ | INITIALS
SEAL NO. | SEAL INTACT YES☐ NO☐ | INITIALS

NOTES: TEMP. ON ARRIVAL RT

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

Erickson Closure Ash Characterization:

Method	Analyte
E300.0	Chloride Fluoride Sulfate
Gamma method - DOE HASL 300, 4.5.2.3/Ga-01-R	Radium 226
Gamma method - DOE HASL 300, 4.5.2.3/Ga-01-R	Radium 228
SM2540B	Total Solids
SW7196A	Chromium VI
SW7471B	Mercury
SW6020A	Antimony Arsenic Barium Beryllium Boron Cadmium Calcium Chromium III Cobalt Copper Iron Lead Lithium Magnesium Molybdenum Nickel Potassium Selenium Silver Sodium Thallium Vanadium Zinc

GEL Laboratories LLC
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February 28, 2023

John Laverty
Merit Laboratories Inc.
2680 East Lansing Drive
East Lansing, Michigan 48823

Re: Routine Analysis
Work Order: 609724
SDG: S44784

Dear John Laverty:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 06, 2023. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Jordan Melton for
Delaney Stone
Project Manager

Purchase Order: GELP20-0018
Enclosures

Table of Contents

Case Narrative

Receipt Narrative
for
Merit Laboratories, Inc.
SDG: S44784
Work Order: 609724

February 28, 2023

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on February 06, 2023 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
609724001	S44784.01
609724002	S44784.02
609724003	S44784.03
609724004	S44784.04
609724005	S44784.05
609724006	S44784.06

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

Jordan Melton for
Delaney Stone
Project Manager

Chain of Custody and Supporting Documentation

609724

Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Project Management Team
COMPANY: Merit Laboratories
ADDRESS: 2680 East Lansing Drive
CITY: East Lansing STATE: MI ZIP CODE: 48823
PHONE NO.: 517-332-0167 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: results@meritlabs.com QUOTE NO.:

INVOICE TO

CONTACT NAME: Julie Teague ☒ SAME
COMPANY: Merit Laboratories
ADDRESS: 2680 East Lansing Drive
CITY: East Lansing STATE: MI ZIP CODE: 48823
PHONE NO.: 517-332-0167 E-MAIL ADDRESS: juliet@meritlabs.com

PROJECT NO./NAME: S44784 SAMPLER(S) - PLEASE PRINT/SIGN NAME:

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☒ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications: ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES

Project Locations: ☐ Detroit ☐ New York ☐ Other

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	Gamma Scan*	Special Instructions
	1/20/23	1100	S44784.01	S	1	1							✓	*Ra-226, Ra-228, and Pb-210
	1/20/23	1100	S44784.02	S	1	1							✓	Method: DOE HASL
	1/20/23	1100	S44784.03	S	1	1							✓	300 4.5.2.3/GA-01-R
	1/20/23	1130	S44784.04	S	1	1							✓	
	1/20/23	1130	S44784.05	S	1	1							✓	
	1/20/23	1130	S44784.06	S	1	1							✓	
														** Subcontracted to
														GEL Laboratories, Inc.
														2040 Savage Road
														Charleston, SC 29407

RELINQUISHED BY: SIGNATURE/ORGANIZATION	☐ Sampler	DATE 2/2/23	TIME 1700
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 2/2/23	TIME 1700
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 2/6/23	TIME 1000
SEAL NO.	SEAL INTACT YES☐ NO☐	INITIALS	NOTES: TEMP. ON ARRIVAL
SEAL NO.	SEAL INTACT YES☐ NO☐	INITIALS	

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

Page 5 of 25 SDG S44784

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: MERI	**SDG/AR/COC/Work Order:** 609724
Received By: Stacy Boone	**Date Received:** 02.06.23
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 1Z 466 477 03 6390 3116

Suspected Hazard Information	Yes	No	
			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*			✓	Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 19 °C
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR3-22 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?			✓	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?			✓	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JM Date 2/6/23 Page 1 of 1

GL-CHL-SR-001 Rev 7

Laboratory Certifications

List of current GEL Certifications as of 28 February 2023

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122023-4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2022-160
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-22-20
Utah NELAP	SC000122022-37
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
Merit Laboratories, Inc.
SDG #: S44784
Work Order #: 609724

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2379496

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
609724001	S44784.01
609724002	S44784.02
609724003	S44784.03
609724004	S44784.04
609724005	S44784.05
609724006	S44784.06

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Ra226/228, Pb-210)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 27
Analytical Batch: 2379916

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2379496

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
609724001	S44784.01
609724002	S44784.02
609724003	S44784.03
609724004	S44784.04
609724005	S44784.05
609724006	S44784.06
1205313910	Method Blank (MB)

1205313911	609724001(S44784.01) Sample Duplicate (DUP)
1205313912	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Radium-228	609724002	S44784.02

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2379496
Analyst: MU1
Date/Time: 06-FEB-2023
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
609724001	SAMPLE		SP-C234673837	18:01	13.2	381.41	186.66	368.21	173.46	52.891
609724002	SAMPLE		SP-C234673837	18:01	13.18	705.08	418.64	691.9	405.46	41.399
609724003	SAMPLE		SP-C234673837	18:01	13.11	466.89	121.32	453.78	108.21	76.153
609724004	SAMPLE		SP-C234673837	18:01	13.02	453.99	133.83	440.97	120.81	72.603
609724005	SAMPLE		SP-C234673837	18:01	13.07	503.99	174.33	490.92	161.26	67.151
609724006	SAMPLE		SP-C234673837	18:01	13.04	586.53	240.94	573.49	227.9	60.26

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

MERI001 Merit Laboratories, Inc.

Client SDG: S44784 GEL Work Order: 609724

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Kenshalla Oston **Name: Kenshalla Oston**

Date: 06 MAR 2023 **Title: Analyst I**

Sample Data Summary

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.01	Project:	MERI00120
Sample ID:	609724001	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:00		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210	U	0.161	+/-4.31	8.01		pCi/g			RXF2	02/28/23	0506	2379916	1
Radium-226		0.646	+/-0.174	0.138		pCi/g							
Radium-228		0.703	+/-0.251	0.184		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.02	Project:	MERI00120
Sample ID:	609724002	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:00		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210	U	-1.18	+/-1.98	3.36		pCi/g			RXF2	02/28/23	0506	2379916	1
Radium-226		0.710	+/-0.130	0.0638		pCi/g							
Radium-228	UI	0.000	+/-0.262	0.210		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.03	Project:	MERI00120
Sample ID:	609724003	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:00		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210		3.85	+/-1.21	0.701		pCi/g			RXF2	02/28/23	0507	2379916	1
Radium-226		0.650	+/-0.217	0.212		pCi/g							
Radium-228		0.564	+/-0.373	0.477		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.04	Project:	MERI00120
Sample ID:	609724004	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:30		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210	U	-6.84	+/-25.9	41.1		pCi/g			RXF2	02/28/23	0508	2379916	1
Radium-226		5.48	+/-0.596	0.304		pCi/g							
Radium-228		3.35	+/-0.724	0.535		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.05	Project:	MERI00120
Sample ID:	609724005	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:30		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210	U	5.22	+/-15.5	28.6		pCi/g			RXF2	02/28/23	0508	2379916	1
Radium-226		2.36	+/-0.285	0.204		pCi/g							
Radium-228		1.51	+/-0.575	0.490		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2023

Company : Merit Laboratories Inc.
Address : 2680 East Lansing Drive

East Lansing, Michigan 48823
Contact: John Laverty
Project: Routine Analysis

Client Sample ID:	S44784.06	Project:	MERI00120
Sample ID:	609724006	Client ID:	MERI001
Matrix:	Solid		
Collect Date:	20-JAN-23 11:30		
Receive Date:	06-FEB-23		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Ra226/228, Pb-210) "Dry Weight Corrected"													
Lead-210	U	12.5	+/-17.4	23.3		pCi/g			RXF2	02/28/23	0520	2379916	1
Radium-226		3.90	+/-0.462	0.279		pCi/g							
Radium-228		2.59	+/-0.603	0.529		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MU1	02/06/23	1801	2379496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Quality Control Data

QC Summary

Report Date: March 6, 2023

Merit Laboratories Inc.
2680 East Lansing Drive
East Lansing, Michigan

Contact: **John Laverty**

Workorder: **609724**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2379916										
QC1205313911 609724001 DUP										
Lead-210	U	0.161	U	-4.69	pCi/g	N/A		N/A	RXF2	02/28/23 06:51
	Uncertainty	+/-4.31		+/-10.3						
Radium-226		0.646		0.562	pCi/g	13.9		(0% - 100%)		
	Uncertainty	+/-0.174		+/-0.186						
Radium-228		0.703	U	0.337	pCi/g	61.7		(0% - 100%)		
	Uncertainty	+/-0.251		+/-0.299						
QC1205313912 LCS										
Americium-241	484			542	pCi/g		112	(75%-125%)		02/28/23 06:58
	Uncertainty			+/-13.5						
Cesium-137	155			155	pCi/g		100	(75%-125%)		
	Uncertainty			+/-3.20						
Cobalt-60	69.6			68.1	pCi/g		97.9	(75%-125%)		
	Uncertainty			+/-2.52						
Lead-210				4560	pCi/g					
	Uncertainty			+/-355						
Radium-226			U	0.102	pCi/g					
	Uncertainty			+/-1.03						
Radium-228				4.42	pCi/g					
	Uncertainty			+/-4.40						
QC1205313910 MB										
Lead-210			U	2.44	pCi/g					02/28/23 05:21
	Uncertainty			+/-4.06						
Radium-226			U	-0.0250	pCi/g					
	Uncertainty			+/-0.0522						
Radium-228			U	-0.0464	pCi/g					
	Uncertainty			+/-0.105						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

QC Summary

Workorder: **609724**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
J	Value is estimated
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
H	Analytical holding time was exceeded
<	Result is less than value reported
>	Result is greater than value reported
UI	Gamma Spectroscopy--Uncertain identification
BD	Results are either below the MDC or tracer recovery is low
h	Preparation or preservation holding time was exceeded
R	Sample results are rejected
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
N/A	RPD or %Recovery limits do not apply.
ND	Analyte concentration is not detected above the detection limit
M	M if above MDC and less than LLD
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
FA	Failed analysis.
UJ	Gamma Spectroscopy--Uncertain identification
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
N1	See case narrative
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
**	Analyte is a Tracer compound
M	REMP Result > MDC/CL and < RDL
J	See case narrative for an explanation

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Gamma Spectroscopy
Raw Data

Batch 2379916 Check-list

This check-list was completed on 28-FEB-23 by Tim Winters

This batch was reviewed by Spencer Collins on 28-FEB-23 and Tim Winters on 28-FEB-23.

Batch ID: 2379916 **Product:** GSCGAMMS **Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
Preparation Information				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
11	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Gamma Spectroscopy

Batch ID: **2379916**
Analyst: Rebekah Futch (RXF2)
Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Lab SOP: GL-RAD-A-013 REV# 27
Instrument: No instrument-manual method

Due Dates for Lab: 04-MAR-2023 **Package: 05-MAR-2023** **SDG: 06-MAR-2023**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205313912	84680-278	1556	1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Adjusted Aliquot (g)
1	609724001	08-FEB-2023	.1	Dry to Dry	96.81	96.81	96.81
2	609724002	08-FEB-2023	.1	Dry to Dry	137.48	137.48	137.48
3	609724003	08-FEB-2023	.1	Dry to Dry	64.87	64.87	64.87
4	609724004	08-FEB-2023	.1	Dry to Dry	64.74	64.74	64.74
5	609724005	08-FEB-2023	.1	Dry to Dry	74.06	74.06	74.06
6	609724006	08-FEB-2023	.1	Dry to Dry	72.05	72.05	72.05
7	1205313910 MB	08-FEB-2023	.1	Dry to Wet	137.48	137.48	137.48
8	1205313911 DUP (609724001)	08-FEB-2023	.1	Dry to Dry	96.81	96.81	96.81
9	1205313912 LCS	08-FEB-2023	.1	Dry to Wet	115	115	115

Reagent/Solvent Lot ID	Description	Amount

Comments:

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:06:48.22

****

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

****

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724001.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM28.CNF;603

Sample date	: 20-JAN-2023 11:00:00	Background date	: 26-FEB-2023 09:14:06
Sample ID	: G609724001	Acquisition date	: 28-FEB-2023 05:06:13
Detector name	: GAM28	Sample quantity	: 9.68100E+01 GRAM
Elapsed live time	: 0 01:00:00.00	Detector geometry	: CAN
Energy tolerance	: 1.50000 keV	Elapsed real time	: 0 01:00:00.37 0.0%
Abundance limit	: 75.00000	Analyst Initials	: RXF2
Batch ID	: 2379916	Sensitivity	: 3.00000
Matrix Spike ID	:	Detector SN#	:
		LCS ID	:

****

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.39*	11	58	0.60	127.21	124	6	3.10E-03	122.4	
2	2	74.59	74	59	1.19	149.60	144	18	2.05E-02	21.7	7.90E-01
3	2	77.09	77	63	1.20	154.58	144	18	2.15E-02	20.9	
4	0	83.83*	32	110	1.61	168.07	161	11	8.81E-03	67.2	
5	0	87.41	61	55	1.69	175.21	172	7	1.69E-02	24.4	
6	0	91.83*	44	100	0.96	184.05	179	11	1.22E-02	51.2	
7	0	147.64	15	54	1.14	295.60	292	6	4.17E-03	81.6	
8	0	185.72*	19	82	1.31	371.73	368	9	5.36E-03	94.6	
9	0	210.02*	18	68	1.76	420.30	414	10	4.93E-03	91.6	
10	0	225.40	35	53	1.89	451.05	445	13	9.73E-03	45.8	
11	0	232.32	13	29	1.25	464.88	462	6	3.50E-03	73.0	
12	0	238.49*	123	97	1.14	477.22	472	9	3.43E-02	17.3	
13	0	241.51*	33	50	1.56	483.25	481	7	9.16E-03	42.0	
14	0	262.49	17	29	1.42	525.19	523	7	4.83E-03	55.1	
15	2	270.69	27	42	1.51	541.58	537	22	7.52E-03	44.8	2.61E+00
16	2	273.66	15	38	1.51	547.52	537	22	4.19E-03	79.3	
17	2	277.41	27	34	1.52	555.03	537	22	7.48E-03	43.5	
18	0	295.53*	81	44	1.15	591.25	586	10	2.26E-02	18.3	
19	0	338.30*	43	38	2.58	676.75	672	12	1.20E-02	33.7	
20	0	351.83*	120	36	1.06	703.79	698	12	3.35E-02	13.7	
21	0	441.42	24	13	3.73	882.91	877	13	6.59E-03	37.5	
22	0	463.85	27	17	1.67	927.75	921	12	7.51E-03	36.6	
23	0	499.42	17	22	4.10	998.86	989	16	4.81E-03	67.1	
24	0	511.11*	34	23	3.06	1022.22	1015	18	9.45E-03	49.1	
25	0	550.35	16	13	2.25	1100.67	1091	13	4.45E-03	52.6	
26	0	562.13	16	18	2.86	1124.23	1118	15	4.46E-03	63.6	
27	0	583.32*	43	31	1.39	1166.59	1161	14	1.18E-02	33.6	
28	0	598.71	35	9	2.89	1197.36	1188	17	9.58E-03	25.8	
29	0	609.13*	85	27	1.11	1218.19	1213	11	2.36E-02	16.6	
30	0	637.85	19	2	0.56	1275.62	1271	11	5.22E-03	28.4	
31	0	643.66	17	6	2.33	1287.24	1282	11	4.81E-03	35.7	
32	0	859.80	20	6	1.28	1719.41	1714	11	5.42E-03	32.5	
33	0	911.07*	46	4	1.77	1821.93	1814	14	1.27E-02	18.2	
34	0	937.54	8	4	1.39	1874.87	1872	7	2.08E-03	55.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	963.13	12	4	1.56	1926.04	1921	9	3.30E-03	43.0	
36	0	969.06	20	7	3.44	1937.90	1931	14	5.56E-03	35.9	
37	0	982.07	11	3	0.76	1963.91	1957	12	3.15E-03	42.2	
38	0	1052.58	8	5	0.78	2104.91	2102	7	2.30E-03	57.0	
39	0	1057.05	7	0	1.35	2113.86	2111	6	1.94E-03	37.8	
40	0	1227.64	13	12	6.21	2455.00	2446	16	3.66E-03	64.9	
41	0	1276.69	10	0	0.73	2553.10	2550	7	2.78E-03	31.6	
42	0	1407.69	9	0	1.46	2815.11	2809	10	2.50E-03	33.3	
43	0	1460.26*	188	0	1.78	2920.26	2914	13	5.23E-02	7.4	
44	0	1763.58*	12	3	0.78	3526.97	3520	13	3.46E-03	43.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:06:49

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724001.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 20-JAN-2023 11:00:00	Acquisition date	: 28-FEB-2023 05:06:13
Sample ID	: G609724001	Sample quantity	: 96.810 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA28	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.37 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	175	10.66*	1.214E+00	1.051E+01	1.051E+01	14.90
CD-109	88.03	58	3.70*	5.762E+00	2.120E+00	2.247E+00	48.85
SN-126	64.28	11	9.60	3.029E+00	2.865E-01	2.865E-01	244.81
	86.94	58	8.90	5.762E+00	8.812E-01	8.812E-01	48.85
	87.57	58	37.00*	5.762E+00	2.120E-01	2.120E-01	48.85
TL-208	277.37	26	6.60	4.535E+00	6.617E-01	6.617E-01	86.92
	583.19	40	85.00*	2.653E+00	1.378E-01	1.378E-01	67.11
	860.56	18	12.50	1.921E+00	5.901E-01	5.901E-01	64.97
BI-211	72.87	------	1.23	4.331E+00	------ Line Not Found		------
	351.06	114	12.92*	3.845E+00	1.779E+00	1.779E+00	27.49
PB-212	74.82	71	10.28	4.541E+00	1.179E+00	1.179E+00	43.43
	77.11	74	17.10	4.825E+00	6.988E-01	6.988E-01	41.76
	238.63	117	43.60*	5.023E+00	4.147E-01	4.147E-01	34.61
	300.09	------	3.30	4.296E+00	------ Line Not Found		------
BI-213	440.45	22	25.94*	3.271E+00	2.045E-01	2.045E-01	75.07
BI-214	609.32	80	45.49*	2.565E+00	5.306E-01	5.306E-01	33.23
	1120.29	------	14.92	1.517E+00	------ Line Not Found		------
	1764.49	12	15.30	1.074E+00	5.473E-01	5.473E-01	86.81
PB-214	74.82	71	5.80	4.541E+00	2.089E+00	2.090E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
RN-222	609.32	80	45.49*	2.565E+00	5.306E-01	5.306E-01	33.23
	1120.29	------	14.92	1.517E+00	------ Line Not Found		------
	1764.49	12	15.30	1.074E+00	5.473E-01	5.473E-01	86.81
RA-224	240.99	31	4.10*	4.981E+00	1.189E+00	1.189E+00	84.08
RA-226	74.82	71	5.80	4.541E+00	2.089E+00	2.090E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
AC-228	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
RA-228	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
TH-228	74.82	71	10.28	4.541E+00	1.179E+00	1.179E+00	43.43
	77.11	74	17.10	4.825E+00	6.988E-01	6.988E-01	41.76
	238.63	117	43.60*	5.023E+00	4.147E-01	4.147E-01	34.61
	300.09	------	3.30	4.296E+00	------ Line Not Found		------
TH-230	74.82	71	5.80	4.541E+00	2.089E+00	2.089E+00	43.43

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
TH-232	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
TH-234	63.29	11	3.70*	3.029E+00	7.432E-01	7.432E-01	244.81
	92.59	42	4.23	6.051E+00	1.272E+00	1.272E+00	102.33
U-234	74.82	71	5.80	4.541E+00	2.089E+00	2.089E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
U-238	63.29	11	3.70*	3.029E+00	7.432E-01	7.432E-01	244.81
	92.59	42	4.23	6.051E+00	1.272E+00	1.272E+00	102.33
AM-243	43.53	------	5.90	4.782E-01	------ Line Not Found		------
	74.66	71	67.20*	4.541E+00	1.803E-01	1.803E-01	43.43
ANH-511	511.00	32	100.00*	2.936E+00	8.464E-02	8.464E-02	98.11

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:06:50.40

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724001.CNF;1		
Acquisition date	28-FEB-2023 05:06:13	Sensitivity	3.000
Detector ID	GAM28	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.37	Half life ratio	*****
Sample date	20-JAN-2023 11:00:00	Analyst initials	RXF2
Sample ID	G609724001	Sample Quantity	9.6810E+01 GRAM
Batch Number	2379916	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	2-JUN-2022 10:12:36	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;16		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.051E+01	1.534E+00	7.096E-01
CD-109	2.247E+00	1.076E+00	1.168E+00
SN-126	2.120E-01	1.015E-01	1.107E-01
TL-208	1.378E-01	9.064E-02	7.069E-02
BI-211	1.779E+00	4.792E-01	3.793E-01
PB-212	4.147E-01	1.407E-01	1.195E-01
BI-213	2.045E-01	1.505E-01	1.530E-01
BI-214	5.306E-01	1.728E-01	1.753E-01
PB-214	6.456E-01	1.739E-01	1.380E-01
RN-222	5.306E-01	1.728E-01	1.753E-01
RA-224	1.189E+00	9.800E-01	1.351E+00
RA-226	6.456E-01	1.739E-01	1.380E-01
AC-228	7.029E-01	2.512E-01	1.844E-01
RA-228	7.029E-01	2.512E-01	1.844E-01
TH-228	4.147E-01	1.407E-01	1.195E-01
TH-230	6.456E-01	1.739E-01	1.379E-01
TH-232	7.029E-01	2.512E-01	1.844E-01
TH-234	7.432E-01	1.783E+00	2.458E+00
U-234	6.456E-01	1.739E-01	1.379E-01
U-238	7.432E-01	1.783E+00	2.458E+00
AM-243	1.803E-01	7.676E-02	8.392E-02
ANH-511	8.464E-02	8.139E-02	4.498E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-1.323E-01	3.720E-01	6.882E-01	NOT IDENT.
NA-22	-2.980E-02	4.313E-02	5.876E-02	NOT IDENT.
NA-24	0.000E+00	1.675E+17	0.000E+00	SHORT HLIF
AL-26	-1.156E-02	3.204E-02	6.237E-02	NOT IDENT.
SC-46	-9.557E-04	5.207E-02	9.889E-02	NOT IDENT.
V-48	2.599E-01	2.151E-01	4.254E-01	FAIL ABUN
CR-51	8.130E-01	5.866E-01	1.329E+00	NOT IDENT.
MN-52	-7.308E-01	3.346E+00	7.096E+00	NOT IDENT.

MN-54	3.653E-03	3.488E-02	6.950E-02	NOT IDENT.
CO-56	-2.397E-02	5.145E-02	8.870E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.378E-04	2.384E-02	4.298E-02	NOT IDENT.
CO-58	5.634E-03	4.255E-02	8.668E-02	NOT IDENT.
FE-59	-3.208E-02	1.095E-01	2.156E-01	NOT IDENT.
CO-60	-2.214E-02	3.980E-02	7.165E-02	NOT IDENT.
ZN-65	-5.553E-02	1.199E-01	2.182E-01	NOT IDENT.
GE-68	1.016E+00	1.470E+00	3.286E+00	NOT IDENT.
AS-73	-1.386E-01	1.073E+00	1.970E+00	NOT IDENT.
AS-74	1.101E-02	2.230E-01	4.351E-01	NOT IDENT.
SE-75	-7.609E-03	6.211E-02	9.722E-02	NOT IDENT.
BR-77	0.000E+00	2.164E+04	0.000E+00	SHORT HLIF
SR-82	-1.233E-01	6.991E-01	1.285E+00	NOT IDENT.
RB-83	3.887E-02	8.400E-02	1.738E-01	NOT IDENT.
RB-84	4.957E-02	1.130E-01	2.384E-01	NOT IDENT.
KR-85	4.593E+00	6.217E+00	1.341E+01	NOT IDENT.
SR-85	3.094E-02	4.219E-02	9.095E-02	NOT IDENT.
RB-86	1.273E+00	2.148E+00	4.713E+00	NOT IDENT.
Y-88	-2.296E-02	3.834E-02	6.471E-02	NOT IDENT.
Y-91	-1.241E+01	2.600E+01	4.782E+01	NOT IDENT.
NB-94	-2.110E-02	3.422E-02	5.779E-02	NOT IDENT.
NB-95	-7.231E-03	5.996E-02	1.104E-01	NOT IDENT.
NB-95M	7.450E-02	2.180E-01	3.213E-01	NOT IDENT.
ZR-95	-1.785E-03	1.066E-01	2.005E-01	NOT IDENT.
NB-97	0.000E+00	1.412E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	2.070E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	4.868E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-6.632E-03	2.952E-02	5.163E-02	NOT IDENT.
RH-102	1.558E-02	6.054E-02	1.199E-01	NOT IDENT.
RU-103	7.277E-02	6.039E-02	1.358E-01	FAIL ABUN
RH-106	2.218E-01	3.139E-01	6.800E-01	NOT IDENT.
RU-106	2.218E-01	3.139E-01	6.800E-01	NOT IDENT.
AG-108M	6.243E-03	3.061E-02	6.039E-02	NOT IDENT.
AG-110	4.591E-01	6.694E-01	1.483E+00	NOT IDENT.
AG-110M	-5.928E-03	5.649E-02	1.057E-01	FAIL ABUN
SN-113	8.555E-03	5.128E-02	1.009E-01	NOT IDENT.
CD-115	0.000E+00	1.574E+04	0.000E+00	SHORT HLIF
SN-117M	-5.690E-02	1.781E-01	3.042E-01	NOT IDENT.
SB-122	0.000E+00	7.390E+02	0.000E+00	SHORT HLIF
TE-123M	-5.649E-03	3.235E-02	5.616E-02	NOT IDENT.
SB-124	-8.572E-04	6.544E-02	1.689E-01	NOT IDENT.
SB-125	1.910E-02	8.949E-02	1.783E-01	FAIL ABUN
TE-125M	4.542E+00	1.132E+01	2.140E+01	NOT IDENT.
I-126	-5.822E-01	6.582E-01	1.035E+00	NOT IDENT.
SB-126	-3.731E-01	5.713E-01	9.543E-01	NOT IDENT.
SB-127	0.000E+00	7.254E+01	0.000E+00	SHORT HLIF
I-131	-6.209E-01	8.568E-01	1.499E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.269E+02	0.000E+00	SHORT HLIF
BA-133	2.098E-02	3.947E-02	7.630E-02	FAIL ABUN
I-133	0.000E+00	8.938E+11	0.000E+00	SHORT HLIF
CS-134	-1.709E-02	4.772E-02	8.401E-02	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	1.833E-01	4.018E-01	8.358E-01	FAIL ABUN
BA-137M	-5.979E-03	3.873E-02	7.162E-02	NOT IDENT.
CS-137	-6.316E-03	4.091E-02	7.566E-02	NOT IDENT.
LA-138	2.040E-02	3.805E-02	1.039E-01	NOT IDENT.
CE-139	4.616E-03	3.298E-02	5.928E-02	NOT IDENT.
BA-140	-1.746E-01	1.044E+00	1.944E+00	NOT IDENT.
LA-140	1.164E-01	2.312E-01	6.260E-01	NOT IDENT.
CE-141	-1.142E-01	1.205E-01	1.787E-01	NOT IDENT.
CE-143	0.000E+00	1.870E+07	0.000E+00	SHORT HLIF
CE-144	2.230E-03	1.937E-01	3.476E-01	NOT IDENT.
PM-144	-3.149E-02	4.206E-02	6.907E-02	NOT IDENT.
PR-144	-2.397E+00	3.185E+00	5.226E+00	NOT IDENT.
PM-146	-2.545E-03	3.815E-02	7.382E-02	NOT IDENT.
ND-147	1.867E+00	2.268E+00	5.014E+00	FAIL ABUN
PM-147	7.794E+00	6.581E+02	1.192E+03	NOT IDENT.
PM-149	0.000E+00	1.624E+05	0.000E+00	SHORT HLIF
EU-150	1.758E-02	2.837E-02	5.406E-02	FAIL ABUN
EU-152	3.122E-02	9.412E-02	1.828E-01	FAIL ABUN
GD-153	-2.655E-02	8.793E-02	1.556E-01	NOT IDENT.
EU-154	-9.179E-02	1.185E-01	1.516E-01	NOT IDENT.
EU-155	2.316E-02	9.539E-02	1.772E-01	FAIL ABUN
TB-160	6.822E-02	1.640E-01	3.451E-01	FAIL ABUN
HO-166M	-2.818E-02	6.862E-02	1.204E-01	FAIL ABUN

TM-171	1.255E+01	1.723E+01	3.497E+01	NOT IDENT.
HF-172	8.863E-02	1.736E-01	3.303E-01	FAIL ABUN
LU-172	6.187E-02	6.489E-02	1.540E-01	FAIL ABUN
LU-176	3.367E-03	2.370E-02	4.701E-02	FAIL ABUN
HF-181	1.523E-02	6.214E-02	1.249E-01	NOT IDENT.
TA-182	2.652E-02	2.021E-01	3.842E-01	NOT IDENT.
RE-183	-2.204E-01	2.484E-01	4.168E-01	NOT IDENT.
RE-184	-1.339E-01	1.862E-01	2.959E-01	NOT IDENT.
W-188	4.768E-02	1.006E+01	1.747E+01	FAIL ABUN
IR-192	-3.398E-03	3.905E-02	7.532E-02	FAIL ABUN
HG-203	-1.404E-02	5.752E-02	9.673E-02	NOT IDENT.
TL-204	-3.180E-01	4.765E+00	8.004E+00	FAIL ABUN
BI-207	1.349E-02	4.793E-02	1.047E-01	FAIL ABUN
BI-210	1.605E-01	4.313E+00	8.009E+00	NOT IDENT.
PB-210	1.605E-01	4.313E+00	8.009E+00	NOT IDENT.
PB-211	-2.600E-01	7.233E-01	1.324E+00	NOT IDENT.
BI-212	2.694E-01	5.248E-01	1.112E+00	NOT IDENT.
RN-219	2.271E-01	3.772E-01	7.899E-01	FAIL ABUN
RA-223	-4.288E-01	5.496E-01	9.620E-01	FAIL ABUN
AC-225	-3.647E-01	3.043E+00	5.264E+00	NOT IDENT.
AC-227	4.942E-02	2.417E-01	4.396E-01	NOT IDENT.
TH-227	4.942E-02	2.417E-01	4.396E-01	NOT IDENT.
TH-229	-8.343E-02	4.940E-01	8.552E-01	FAIL ABUN
PA-231	-1.353E-01	4.741E-01	8.834E-01	NOT IDENT.
TH-231	-4.288E-01	5.496E-01	9.620E-01	FAIL ABUN
PA-233	5.592E-02	6.335E-02	1.338E-01	NOT IDENT.
PA-234	-2.558E-02	3.518E-01	6.527E-01	NOT IDENT.
PA-234M	6.063E+00	5.812E+00	1.305E+01	NOT IDENT.
U-235	2.795E-02	2.184E-01	3.742E-01	FAIL ABUN
NP-237	5.592E-02	6.335E-02	1.338E-01	NOT IDENT.
NP-238	0.000E+00	5.305E+04	0.000E+00	SHORT HLIF
NP-239	2.990E-02	2.127E-01	3.951E-01	FAIL ABUN
PU-239	2.660E+02	2.997E+02	5.910E+02	NOT IDENT.
AM-241	-3.707E-02	1.590E-01	2.856E-01	NOT IDENT.
CM-243	-1.086E-02	9.161E-02	1.644E-01	FAIL ABUN
BK-247	7.069E-02	8.150E-02	1.529E-01	FAIL ABUN
CM-247	5.754E-04	3.483E-02	6.770E-02	FAIL ABUN
CF-249	-7.740E-04	3.752E-02	7.259E-02	NOT IDENT.
CF-251	-4.882E-04	1.270E-01	2.244E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:06:48.97

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	175	10.66*	1.214E+00	1.051E+01	1.051E+01	14.90
CD-109	88.03	58	3.70*	5.762E+00	2.120E+00	2.247E+00	48.85
SN-126	64.28	11	9.60	3.029E+00	2.865E-01	2.865E-01	244.81
	86.94	58	8.90	5.762E+00	8.812E-01	8.812E-01	48.85
	87.57	58	37.00*	5.762E+00	2.120E-01	2.120E-01	48.85
TL-208	277.37	26	6.60	4.535E+00	6.617E-01	6.617E-01	86.92
	583.19	40	85.00*	2.653E+00	1.378E-01	1.378E-01	67.11
	860.56	18	12.50	1.921E+00	5.901E-01	5.901E-01	64.97
BI-211	72.87	------	1.23	4.331E+00	------ Line Not Found		------
	351.06	114	12.92*	3.845E+00	1.779E+00	1.779E+00	27.49
PB-212	74.82	71	10.28	4.541E+00	1.179E+00	1.179E+00	43.43
	77.11	74	17.10	4.825E+00	6.988E-01	6.988E-01	41.76
	238.63	117	43.60*	5.023E+00	4.147E-01	4.147E-01	34.61
	300.09	------	3.30	4.296E+00	------ Line Not Found		------
BI-213	440.45	22	25.94*	3.271E+00	2.045E-01	2.045E-01	75.07
BI-214	609.32	80	45.49*	2.565E+00	5.306E-01	5.306E-01	33.23
	1120.29	------	14.92	1.517E+00	------ Line Not Found		------
	1764.49	12	15.30	1.074E+00	5.473E-01	5.473E-01	86.81
PB-214	74.82	71	5.80	4.541E+00	2.089E+00	2.090E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
RN-222	609.32	80	45.49*	2.565E+00	5.306E-01	5.306E-01	33.23
	1120.29	------	14.92	1.517E+00	------ Line Not Found		------
	1764.49	12	15.30	1.074E+00	5.473E-01	5.473E-01	86.81
RA-224	240.99	31	4.10*	4.981E+00	1.189E+00	1.189E+00	84.08
RA-226	74.82	71	5.80	4.541E+00	2.089E+00	2.090E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
AC-228	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
RA-228	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
TH-228	74.82	71	10.28	4.541E+00	1.179E+00	1.179E+00	43.43
	77.11	74	17.10	4.825E+00	6.988E-01	6.988E-01	41.76
	238.63	117	43.60*	5.023E+00	4.147E-01	4.147E-01	34.61

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	300.09	------	3.30	4.296E+00	------ Line Not Found		------
TH-230	74.82	71	5.80	4.541E+00	2.089E+00	2.089E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
TH-232	105.21	------	1.10	6.589E+00	------ Line Not Found		------
	338.32	41	11.27	3.952E+00	7.116E-01	7.116E-01	67.49
	835.71	------	1.61	1.970E+00	------ Line Not Found		------
	911.20	43	25.80*	1.826E+00	7.029E-01	7.029E-01	36.46
	968.97	19	15.80	1.728E+00	5.319E-01	5.319E-01	71.76
TH-234	63.29	11	3.70*	3.029E+00	7.432E-01	7.432E-01	244.81
	92.59	42	4.23	6.051E+00	1.272E+00	1.272E+00	102.33
U-234	74.82	71	5.80	4.541E+00	2.089E+00	2.089E+00	43.43
	77.11	74	9.70	4.825E+00	1.232E+00	1.232E+00	41.76
	87.09	58	3.41	5.762E+00	2.300E+00	2.300E+00	48.85
	242.00	31	7.25	4.981E+00	6.727E-01	6.727E-01	84.08
	295.22	77	18.42	4.342E+00	7.476E-01	7.476E-01	36.51
	351.93	114	35.60*	3.845E+00	6.456E-01	6.456E-01	27.49
U-238	63.29	11	3.70*	3.029E+00	7.432E-01	7.432E-01	244.81
	92.59	42	4.23	6.051E+00	1.272E+00	1.272E+00	102.33
AM-243	43.53	------	5.90	4.782E-01	------ Line Not Found		------
	74.66	71	67.20*	4.541E+00	1.803E-01	1.803E-01	43.43
ANH-511	511.00	32	100.00*	2.936E+00	8.464E-02	8.464E-02	98.11

Flag: "*" = Keyline

Sample ID : G609724001 Acquisition date : 28-FEB-2023 05:06:13

Total number of lines in spectrum 44
Number of unidentified lines 12
Number of lines tentatively identified by NID 32 72.73%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.051E+01	1.051E+01	0.157E+01	14.90	
CD-109	461.40D	1.06	2.120E+00	2.247E+00	1.098E+00	48.85	
SN-126	2.30E+05Y	1.00	2.120E-01	2.120E-01	1.035E-01	48.85	
TL-208	1.41E+10Y	1.00	1.378E-01	1.378E-01	0.925E-01	67.11	
BI-211	7.04E+08Y	1.00	1.779E+00	1.779E+00	0.489E+00	27.49	
PB-212	1.41E+10Y	1.00	4.147E-01	4.147E-01	1.435E-01	34.61	
BI-213	7340.00Y	1.00	2.045E-01	2.045E-01	1.536E-01	75.07	
BI-214	1600.00Y	1.00	5.306E-01	5.306E-01	1.763E-01	33.23	
PB-214	1600.00Y	1.00	6.456E-01	6.456E-01	1.775E-01	27.49	
RN-222	1600.00Y	1.00	5.306E-01	5.306E-01	1.763E-01	33.23	
RA-224	1.41E+10Y	1.00	1.189E+00	1.189E+00	1.000E+00	84.08	
RA-226	1600.00Y	1.00	6.456E-01	6.456E-01	1.775E-01	27.49	
AC-228	1.41E+10Y	1.00	7.029E-01	7.029E-01	2.563E-01	36.46	
RA-228	1.41E+10Y	1.00	7.029E-01	7.029E-01	2.563E-01	36.46	
TH-228	1.41E+10Y	1.00	4.147E-01	4.147E-01	1.435E-01	34.61	
TH-230	7.54E+04Y	1.00	6.456E-01	6.456E-01	1.775E-01	27.49	
TH-232	1.41E+10Y	1.00	7.029E-01	7.029E-01	2.563E-01	36.46	
TH-234	4.47E+09Y	1.00	7.432E-01	7.432E-01	18.20E-01	244.81	
U-234	2.45E+05Y	1.00	6.456E-01	6.456E-01	1.775E-01	27.49	
U-238	4.47E+09Y	1.00	7.432E-01	7.432E-01	18.20E-01	244.81	
AM-243	7370.00Y	1.00	1.803E-01	1.803E-01	0.783E-01	43.43	
ANH-511	1.00E+09Y	1.00	8.464E-02	8.464E-02	8.305E-02	98.11	
			---------	---------			
	Total Activity :		2.448E+01	2.461E+01			

Grand Total Activity : 2.448E+01 2.461E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	83.83	30	105	1.61	168.07	161	11	8.81E-03	****	5.48E+00	T
0	147.64	14	52	1.14	295.60	292	6	4.17E-03	****	6.53E+00	
0	185.72	18	78	1.31	371.73	368	9	5.36E-03	****	5.87E+00	T
0	210.02	17	64	1.76	420.30	414	10	4.93E-03	****	5.45E+00	T
0	225.40	33	50	1.89	451.05	445	13	9.73E-03	91.5	5.21E+00	
0	232.32	12	28	1.25	464.88	462	6	3.50E-03	****	5.11E+00	
0	262.49	16	27	1.42	525.19	523	7	4.83E-03	****	4.71E+00	
2	270.69	26	40	1.51	541.58	537	22	7.52E-03	89.5	4.61E+00	T
2	273.66	14	36	1.51	547.52	537	22	4.19E-03	****	4.58E+00	T
0	463.85	26	16	1.67	927.75	921	12	7.51E-03	73.2	3.15E+00	T
0	499.42	16	20	4.10	998.86	989	16	4.81E-03	****	2.99E+00	
0	550.35	15	12	2.25	1100.67	1091	13	4.45E-03	****	2.78E+00	
0	562.13	15	17	2.86	1124.23	1118	15	4.46E-03	****	2.73E+00	T
0	598.71	32	8	2.89	1197.36	1188	17	9.58E-03	51.6	2.60E+00	
0	637.85	18	2	0.56	1275.62	1271	11	5.22E-03	56.8	2.47E+00	T
0	643.66	16	5	2.33	1287.24	1282	11	4.81E-03	71.4	2.45E+00	
0	937.54	7	3	1.39	1874.87	1872	7	2.08E-03	****	1.78E+00	T
0	963.13	11	4	1.56	1926.04	1921	9	3.30E-03	86.1	1.74E+00	T
0	982.07	11	2	0.76	1963.91	1957	12	3.15E-03	84.5	1.71E+00	T
0	1052.58	8	4	0.78	2104.91	2102	7	2.30E-03	****	1.60E+00	
0	1057.05	7	0	1.35	2113.86	2111	6	1.94E-03	75.6	1.60E+00	
0	1227.64	12	11	6.21	2455.00	2446	16	3.66E-03	****	1.40E+00	
0	1276.69	9	0	0.73	2553.10	2550	7	2.78E-03	63.2	1.35E+00	
0	1407.69	8	0	1.46	2815.11	2809	10	2.50E-03	66.7	1.25E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:00.34

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724001.CNF;1   *
* Acquisition date : 28-FEB-2023 05:06:13 Sensitivity     : 3.000           *
* Detector ID      : GAM28                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.37     Half life ratio : *****           *
* Sample date      : 20-JAN-2023 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G609724001           Analyst initials: RXF2            *
* Batch Number     : 2379916              Sample Quantity : 9.6810E+01 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  2-JUN-2022 10:12:36 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;16            *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.746E-01
CD-109	5.327E-01
SN-126	5.052E-02
TL-208	3.075E-02
BI-211	1.688E-01
PB-212	5.500E-02
BI-213	6.426E-02
BI-214	7.875E-02
PB-214	6.140E-02
RN-222	7.875E-02
RA-224	6.251E-01
RA-226	6.140E-02
AC-228	7.013E-02
RA-228	7.013E-02
TH-228	5.500E-02
TH-230	6.139E-02
TH-232	7.013E-02
TH-234	1.136E+00
U-234	6.139E-02
U-238	1.136E+00
AM-243	3.857E-02
ANH-511	1.895E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	2.907E-01	NOT IDENT.
NA-22	2.149E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.137E-02	NOT IDENT.
SC-46	4.178E-02	NOT IDENT.
V-48	1.799E-01	FAIL ABUN
CR-51	5.974E-01	NOT IDENT.
MN-52	2.514E+00	NOT IDENT.
MN-54	2.901E-02	NOT IDENT.

CO-56	3.679E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.952E-02	NOT IDENT.
CO-58	3.580E-02	NOT IDENT.
FE-59	8.598E-02	NOT IDENT.
CO-60	2.776E-02	NOT IDENT.
ZN-65	9.408E-02	NOT IDENT.
GE-68	1.416E+00	NOT IDENT.
AS-73	8.956E-01	NOT IDENT.
AS-74	1.870E-01	NOT IDENT.
SE-75	4.391E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.478E-01	NOT IDENT.
RB-83	7.604E-02	NOT IDENT.
RB-84	1.010E-01	NOT IDENT.
KR-85	5.880E+00	NOT IDENT.
SR-85	3.988E-02	NOT IDENT.
RB-86	2.033E+00	NOT IDENT.
Y-88	1.956E-02	NOT IDENT.
Y-91	1.947E+01	NOT IDENT.
NB-94	2.434E-02	NOT IDENT.
NB-95	4.774E-02	NOT IDENT.
NB-95M	1.481E-01	NOT IDENT.
ZR-95	8.671E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.351E-02	NOT IDENT.
RH-102	5.237E-02	NOT IDENT.
RU-103	6.037E-02	FAIL ABUN
RH-106	2.955E-01	NOT IDENT.
RU-106	2.955E-01	NOT IDENT.
AG-108M	2.673E-02	NOT IDENT.
AG-110	6.352E-01	NOT IDENT.
AG-110M	4.436E-02	FAIL ABUN
SN-113	4.477E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.385E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.564E-02	NOT IDENT.
SB-124	5.339E-02	NOT IDENT.
SB-125	7.844E-02	FAIL ABUN
TE-125M	9.782E+00	NOT IDENT.
I-126	4.115E-01	NOT IDENT.
SB-126	4.011E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	6.529E-01	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.373E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	3.588E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	3.558E-01	FAIL ABUN
BA-137M	3.099E-02	NOT IDENT.
CS-137	3.274E-02	NOT IDENT.
LA-138	3.906E-02	NOT IDENT.
CE-139	2.711E-02	NOT IDENT.
BA-140	8.479E-01	NOT IDENT.
LA-140	2.343E-01	NOT IDENT.
CE-141	8.187E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.585E-01	NOT IDENT.
PM-144	2.965E-02	NOT IDENT.
PR-144	2.243E+00	NOT IDENT.
PM-146	3.186E-02	NOT IDENT.
ND-147	2.186E+00	FAIL ABUN
PM-147	5.409E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.432E-02	FAIL ABUN
EU-152	8.137E-02	FAIL ABUN
GD-153	7.146E-02	NOT IDENT.
EU-154	5.372E-02	NOT IDENT.
EU-155	8.100E-02	FAIL ABUN
TB-160	1.460E-01	FAIL ABUN
HO-166M	5.172E-02	FAIL ABUN
TM-171	1.588E+01	NOT IDENT.

HF-172	1.510E-01	FAIL ABUN
LU-172	6.594E-02	FAIL ABUN
LU-176	2.089E-02	FAIL ABUN
HF-181	5.451E-02	NOT IDENT.
TA-182	1.575E-01	NOT IDENT.
RE-183	1.884E-01	NOT IDENT.
RE-184	1.163E-01	NOT IDENT.
W-188	7.872E+00	FAIL ABUN
IR-192	3.330E-02	FAIL ABUN
HG-203	4.335E-02	NOT IDENT.
TL-204	3.673E+00	FAIL ABUN
BI-207	4.357E-02	FAIL ABUN
BI-210	3.676E+00	NOT IDENT.
PB-210	3.676E+00	NOT IDENT.
PB-211	5.832E-01	NOT IDENT.
BI-212	4.860E-01	NOT IDENT.
RN-219	3.500E-01	FAIL ABUN
RA-223	4.171E-01	FAIL ABUN
AC-225	2.381E+00	NOT IDENT.
AC-227	1.970E-01	NOT IDENT.
TH-227	1.970E-01	NOT IDENT.
TH-229	3.866E-01	FAIL ABUN
PA-231	3.965E-01	NOT IDENT.
TH-231	4.171E-01	FAIL ABUN
PA-233	6.048E-02	NOT IDENT.
PA-234	2.774E-01	NOT IDENT.
PA-234M	5.790E+00	NOT IDENT.
U-235	1.727E-01	FAIL ABUN
NP-237	6.048E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	1.782E-01	FAIL ABUN
PU-239	2.711E+02	NOT IDENT.
AM-241	1.310E-01	NOT IDENT.
CM-243	7.460E-02	FAIL ABUN
BK-247	6.905E-02	FAIL ABUN
CM-247	2.973E-02	FAIL ABUN
CF-249	3.191E-02	NOT IDENT.
CF-251	1.022E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:04.20

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724001.CNF;1		
Acquisition date	: 28-FEB-2023 05:06:13	Sensitivity	: 3.000
Detector ID	: GAM28	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.37	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Nuclide Library	: SOLID
Sample ID	: G609724001	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 9.6810E+01 GRAM
		Quantity Err(%)	: 1.0330E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 2-JUN-2022 10:12:36	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM28_CAN.CNF;16		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.051E+01	1.824E+00	1.824E+00
CD-109	2.247E+00	1.098E+00	1.098E+00
SN-126	2.120E-01	1.030E-01	1.030E-01
TL-208	1.378E-01	9.147E-02	9.147E-02
BI-211	1.779E+00	5.021E-01	5.021E-01
PB-212	4.147E-01	1.447E-01	1.447E-01
BI-213	2.045E-01	1.516E-01	1.516E-01
BI-214	5.306E-01	1.791E-01	1.791E-01
PB-214	6.456E-01	1.819E-01	1.819E-01
RN-222	5.306E-01	1.791E-01	1.791E-01
RA-224	1.189E+00	9.849E-01	9.849E-01
RA-226	6.456E-01	1.819E-01	1.819E-01
AC-228	7.029E-01	2.603E-01	2.603E-01
RA-228	7.029E-01	2.603E-01	2.603E-01
TH-228	4.147E-01	1.447E-01	1.447E-01
TH-230	6.456E-01	1.819E-01	1.819E-01
TH-232	7.029E-01	2.603E-01	2.603E-01
TH-234	7.432E-01	1.791E+00	1.791E+00
U-234	6.456E-01	1.819E-01	1.819E-01
U-238	7.432E-01	1.791E+00	1.791E+00
AM-243	1.803E-01	7.808E-02	7.808E-02
ANH-511	8.464E-02	8.173E-02	8.173E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.323E-01	3.722E-01	3.769E-01	NOT IDENT.
NA-22	-2.980E-02	4.321E-02	4.525E-02	NOT IDENT.
NA-24	-2.039E+16	1.675E+17	0.000E+00	SHORT HLIF
AL-26	-1.156E-02	3.205E-02	3.247E-02	NOT IDENT.
SC-46	-9.557E-04	5.207E-02	5.207E-02	NOT IDENT.
V-48	2.599E-01	2.164E-01	2.461E-01	FAIL ABUN
CR-51	8.130E-01	5.902E-01	6.947E-01	NOT IDENT.
MN-52	-7.308E-01	3.347E+00	3.363E+00	NOT IDENT.

MN-54	3.653E-03	3.488E-02	3.492E-02	NOT IDENT.
CO-56	-2.397E-02	5.150E-02	5.262E-02	NOT IDENT.
MN-56	-1.000E+41	2.148E+41	0.000E+00	SHORT HLIF
CO-57	-4.378E-04	2.384E-02	2.385E-02	NOT IDENT.
CO-58	5.634E-03	4.255E-02	4.263E-02	NOT IDENT.
FE-59	-3.208E-02	1.095E-01	1.105E-01	NOT IDENT.
CO-60	-2.214E-02	3.985E-02	4.108E-02	NOT IDENT.
ZN-65	-5.553E-02	1.200E-01	1.226E-01	NOT IDENT.
GE-68	1.016E+00	1.472E+00	1.542E+00	NOT IDENT.
AS-73	-1.386E-01	1.073E+00	1.075E+00	NOT IDENT.
AS-74	1.101E-02	2.230E-01	2.231E-01	NOT IDENT.
SE-75	-7.609E-03	6.211E-02	6.221E-02	NOT IDENT.
BR-77	6.381E+04	7.479E+04	8.013E+04	SHORT HLIF
SR-82	-1.233E-01	6.992E-01	7.014E-01	NOT IDENT.
RB-83	3.887E-02	8.422E-02	8.603E-02	NOT IDENT.
RB-84	4.957E-02	1.131E-01	1.153E-01	NOT IDENT.
KR-85	4.593E+00	6.230E+00	6.566E+00	NOT IDENT.
SR-85	3.094E-02	4.228E-02	4.453E-02	NOT IDENT.
RB-86	1.273E+00	2.151E+00	2.226E+00	NOT IDENT.
Y-88	-2.296E-02	3.838E-02	3.975E-02	NOT IDENT.
Y-91	-1.241E+01	2.602E+01	2.662E+01	NOT IDENT.
NB-94	-2.110E-02	3.427E-02	3.557E-02	NOT IDENT.
NB-95	-7.231E-03	5.997E-02	6.005E-02	NOT IDENT.
NB-95M	7.450E-02	2.182E-01	2.207E-01	NOT IDENT.
ZR-95	-1.785E-03	1.066E-01	1.066E-01	NOT IDENT.
NB-97	1.000E+41	1.415E+41	0.000E+00	SHORT HLIF
ZR-97	6.609E+15	2.071E+16	0.000E+00	SHORT HLIF
MO-99	-3.002E+03	4.877E+03	5.061E+03	SHORT HLIF
TC-99M	-1.000E+41	5.904E+41	0.000E+00	SHORT HLIF
RH-101	-6.632E-03	2.955E-02	2.970E-02	NOT IDENT.
RH-102	1.558E-02	6.056E-02	6.097E-02	NOT IDENT.
RU-103	7.277E-02	6.076E-02	6.905E-02	FAIL ABUN
RH-106	2.218E-01	3.147E-01	3.302E-01	NOT IDENT.
RU-106	2.218E-01	3.147E-01	3.302E-01	NOT IDENT.
AG-108M	6.243E-03	3.062E-02	3.075E-02	NOT IDENT.
AG-110	4.591E-01	6.706E-01	7.018E-01	NOT IDENT.
AG-110M	-5.928E-03	5.649E-02	5.655E-02	FAIL ABUN
SN-113	8.555E-03	5.129E-02	5.143E-02	NOT IDENT.
CD-115	-1.953E+03	1.574E+04	1.576E+04	SHORT HLIF
SN-117M	-5.690E-02	1.781E-01	1.800E-01	NOT IDENT.
SB-122	-7.070E+01	7.390E+02	7.397E+02	SHORT HLIF
TE-123M	-5.649E-03	3.235E-02	3.245E-02	NOT IDENT.
SB-124	-8.572E-04	6.544E-02	6.544E-02	NOT IDENT.
SB-125	1.910E-02	8.950E-02	8.992E-02	FAIL ABUN
TE-125M	4.542E+00	1.133E+01	1.151E+01	NOT IDENT.
I-126	-5.822E-01	6.607E-01	7.109E-01	NOT IDENT.
SB-126	-3.731E-01	5.733E-01	5.975E-01	NOT IDENT.
SB-127	1.544E+01	7.260E+01	7.293E+01	SHORT HLIF
I-131	-6.209E-01	8.584E-01	9.029E-01	FAIL ABUN
I-132	-1.000E+41	3.488E+41	0.000E+00	SHORT HLIF
TE-132	1.766E+01	1.269E+02	1.271E+02	SHORT HLIF
BA-133	2.098E-02	3.950E-02	4.062E-02	FAIL ABUN
I-133	-2.133E+11	8.955E+11	9.006E+11	SHORT HLIF
CS-134	-1.709E-02	4.774E-02	4.836E-02	FAIL ABUN
I-135	2.550E+40	4.893E+41	0.000E+00	SHORT HLIF
CS-136	1.833E-01	4.024E-01	4.108E-01	FAIL ABUN
BA-137M	-5.979E-03	3.873E-02	3.882E-02	NOT IDENT.
CS-137	-6.316E-03	4.091E-02	4.101E-02	NOT IDENT.
LA-138	2.040E-02	3.810E-02	3.919E-02	NOT IDENT.
CE-139	4.616E-03	3.299E-02	3.306E-02	NOT IDENT.
BA-140	-1.746E-01	1.044E+00	1.047E+00	NOT IDENT.
LA-140	1.164E-01	2.314E-01	2.373E-01	NOT IDENT.
CE-141	-1.142E-01	1.209E-01	1.314E-01	NOT IDENT.
CE-143	8.108E+06	1.871E+07	1.907E+07	SHORT HLIF
CE-144	2.230E-03	1.937E-01	1.937E-01	NOT IDENT.
PM-144	-3.149E-02	4.215E-02	4.448E-02	NOT IDENT.
PR-144	-2.397E+00	3.192E+00	3.370E+00	NOT IDENT.
PM-146	-2.545E-03	3.815E-02	3.817E-02	NOT IDENT.
ND-147	1.867E+00	2.274E+00	2.425E+00	FAIL ABUN
PM-147	7.794E+00	6.581E+02	6.581E+02	NOT IDENT.
PM-149	-8.305E+04	1.629E+05	1.672E+05	SHORT HLIF
EU-150	1.758E-02	2.841E-02	2.949E-02	FAIL ABUN
EU-152	3.122E-02	9.416E-02	9.520E-02	FAIL ABUN
GD-153	-2.655E-02	8.795E-02	8.876E-02	NOT IDENT.
EU-154	-9.179E-02	1.188E-01	1.258E-01	NOT IDENT.
EU-155	2.316E-02	9.541E-02	9.598E-02	FAIL ABUN
TB-160	6.822E-02	1.642E-01	1.670E-01	FAIL ABUN
HO-166M	-2.818E-02	6.867E-02	6.984E-02	FAIL ABUN

TM-171	1.255E+01	1.728E+01	1.818E+01	NOT IDENT.
HF-172	8.863E-02	1.743E-01	1.788E-01	FAIL ABUN
LU-172	6.187E-02	6.536E-02	7.106E-02	FAIL ABUN
LU-176	3.367E-03	2.370E-02	2.375E-02	FAIL ABUN
HF-181	1.523E-02	6.216E-02	6.254E-02	NOT IDENT.
TA-182	2.652E-02	2.021E-01	2.024E-01	NOT IDENT.
RE-183	-2.204E-01	2.498E-01	2.688E-01	NOT IDENT.
RE-184	-1.339E-01	1.868E-01	1.963E-01	NOT IDENT.
W-188	4.768E-02	1.006E+01	1.006E+01	FAIL ABUN
IR-192	-3.398E-03	3.905E-02	3.908E-02	FAIL ABUN
HG-203	-1.404E-02	5.753E-02	5.788E-02	NOT IDENT.
TL-204	-3.180E-01	4.765E+00	4.768E+00	FAIL ABUN
BI-207	1.349E-02	4.794E-02	4.833E-02	FAIL ABUN
BI-210	1.605E-01	4.313E+00	4.313E+00	NOT IDENT.
PB-210	1.605E-01	4.313E+00	4.313E+00	NOT IDENT.
PB-211	-2.600E-01	7.237E-01	7.331E-01	NOT IDENT.
BI-212	2.694E-01	5.254E-01	5.393E-01	NOT IDENT.
RN-219	2.271E-01	3.787E-01	3.923E-01	FAIL ABUN
RA-223	-4.288E-01	5.510E-01	5.839E-01	FAIL ABUN
AC-225	-3.647E-01	3.043E+00	3.048E+00	NOT IDENT.
AC-227	4.942E-02	2.418E-01	2.428E-01	NOT IDENT.
TH-227	4.942E-02	2.418E-01	2.428E-01	NOT IDENT.
TH-229	-8.343E-02	4.940E-01	4.955E-01	FAIL ABUN
PA-231	-1.353E-01	4.751E-01	4.790E-01	NOT IDENT.
TH-231	-4.288E-01	5.510E-01	5.839E-01	FAIL ABUN
PA-233	5.592E-02	6.352E-02	6.834E-02	NOT IDENT.
PA-234	-2.558E-02	3.531E-01	3.533E-01	NOT IDENT.
PA-234M	6.063E+00	5.838E+00	6.446E+00	NOT IDENT.
U-235	2.795E-02	2.184E-01	2.187E-01	FAIL ABUN
NP-237	5.592E-02	6.352E-02	6.834E-02	NOT IDENT.
NP-238	1.530E+04	5.307E+04	5.352E+04	SHORT HLIF
NP-239	2.990E-02	2.127E-01	2.132E-01	FAIL ABUN
PU-239	2.660E+02	3.004E+02	3.234E+02	NOT IDENT.
AM-241	-3.707E-02	1.590E-01	1.599E-01	NOT IDENT.
CM-243	-1.086E-02	9.162E-02	9.175E-02	FAIL ABUN
BK-247	7.069E-02	8.285E-02	8.876E-02	FAIL ABUN
CM-247	5.754E-04	3.483E-02	3.483E-02	FAIL ABUN
CF-249	-7.740E-04	3.752E-02	3.752E-02	NOT IDENT.
CF-251	-4.882E-04	1.270E-01	1.270E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	30.1813	85.43	46.1572	131.20	37.7189
45.60	38.6313	86.55	46.2502	133.02	38.8922
46.54	34.1184	86.79	36.2115	133.52	35.6753
49.72	0.0000	86.94	36.2214	136.00	41.2169
51.35	45.7496	87.09	36.2310	136.47	46.6691
51.87	33.6558	87.57	36.2620	140.51	0.0000
52.39	22.4662	88.03	36.2917	143.76	35.0615
52.97	26.2482	88.34	22.1905	144.24	36.5448
53.44	35.6636	88.47	22.1955	145.44	49.7770
54.07	38.5382	89.96	22.2538	152.43	29.9062
57.36	0.0000	1093.63	40.5096	153.25	26.6100
57.53	39.8052	91.11	40.5426	323.87	28.8612
57.98	44.5903	92.59	40.6464	156.02	31.1497
59.27	40.9171	93.35	40.6995	158.56	40.1721
59.32	40.9217	94.56	47.5803	159.00	40.1929
59.54	45.7031	94.65	47.5877	162.33	41.4726
60.96	47.1241	94.67	47.5892	162.66	40.3676
61.17	53.5175	94.87	47.6052	163.33	44.8883
62.93	49.8900	97.43	40.9799	165.86	36.0166
63.29	49.9296	98.43	38.9953	176.31	42.1405
63.58	43.5560	98.44	38.9962	176.60	42.1540
64.28	39.7736	99.53	37.0099	177.52	35.3542
66.73	42.5632	100.11	42.1902	181.07	0.0000
67.24	46.4828	102.03	31.9993	181.52	41.2372
125.81	46.5260	103.18	34.1267	184.41	39.8342
67.75	46.5330	103.37	34.1370	143.76	46.0272
68.89	47.6160	105.21	34.2367	193.51	32.4848
69.67	35.0398	105.31	34.2422	197.03	47.7403
70.82	42.9275	106.12	37.4027	198.01	26.8082
70.83	42.9285	106.47	37.4233	201.83	24.5722
72.81	43.1013	109.28	31.3223	203.43	30.4719
72.87	43.1064	111.00	39.7795	205.31	26.6154
74.66	43.2605	111.76	0.0000	210.85	39.3550
74.82	43.2739	114.06	31.5502	215.65	23.7234
74.97	43.2870	116.30	0.0000	218.12	32.1029
77.11	43.4683	116.74	26.3966	222.11	28.6443
78.74	43.6046	119.76	27.5736	227.09	20.3844
79.69	31.7698	121.12	34.0034	227.38	20.3898
80.03	31.7900	121.22	31.8828	228.16	0.0000
80.12	31.7957	121.78	28.7176	228.18	27.2068
80.19	31.7998	122.06	32.9853	116.74	27.2068
80.57	31.8225	122.92	37.2871	235.69	38.6743
81.00	31.8484	123.07	34.0981	235.96	38.6841
81.07	45.7880	265.00	30.9282	238.63	45.2402
81.75	41.8596	125.81	29.9514	238.98	0.0000
82.47	41.9157	127.23	38.5852	240.99	51.0023
83.79	42.0176	127.91	36.4761	242.00	35.6529
84.00	42.0340	129.30	26.8719	244.70	30.8646

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	17.8994	563.25	11.9199
252.80	17.1774	345.93	22.1361	564.24	0.0000
254.15	0.0000	351.06	22.0373	569.33	11.9546
256.23	22.1502	351.93	22.0505	946.00	11.9556
260.90	0.0000	355.39	0.0000	569.70	11.9565
264.66	31.3969	356.01	13.2666	583.19	15.0403
264.80	31.4007	364.49	24.0150	584.27	15.0476
265.00	16.5291	366.42	0.0000	595.83	12.1021
269.46	22.3973	372.51	27.7179	427.87	12.1279
270.03	22.4077	375.05	12.5382	602.52	0.0000
271.23	22.4297	377.52	14.3522	604.72	9.1132
273.65	22.4736	356.01	21.6152	607.14	19.7666
276.40	22.5242	388.16	18.0619	609.32	26.3809
277.37	22.5417	388.63	21.6807	610.33	22.8397
277.60	22.5456	391.69	19.0069	614.28	12.2026
278.00	26.3122	264.66	16.3824	618.01	17.3161
279.20	28.8455	401.81	13.6618	620.36	9.1769
279.54	31.3622	402.40	17.3111	621.93	8.1628
279.70	31.3667	404.85	22.8119	630.19	0.0000
280.46	33.8967	410.95	12.8219	631.29	13.3190
283.69	26.8509	413.71	18.3476	633.25	12.3047
284.31	26.0251	414.70	10.0972	634.78	13.8521
285.41	32.7690	423.72	15.6885	635.95	6.1597
285.90	0.0000	427.09	14.7949	636.99	6.1624
287.50	31.1397	427.87	15.7269	657.50	6.2166
290.67	27.8424	433.94	17.6393	657.76	5.1811
293.27	0.0000	439.40	8.3818	657.90	0.0000
351.93	29.6338	440.45	9.3186	661.66	15.5682
295.96	29.6509	453.88	14.0848	664.57	0.0000
879.38	25.4663	463.37	12.2713	666.33	12.4790
299.98	25.4932	468.07	7.0978	666.50	11.4400
300.09	25.4956	473.00	0.0000	667.71	0.0000
300.13	25.4962	475.06	10.4497	677.62	11.4928
301.36	29.7734	476.78	10.4595	685.70	0.0000
302.85	28.9552	477.60	13.3178	692.65	0.0000
256.23	23.0224	482.18	13.3509	695.00	15.7837
304.85	23.0284	487.02	14.3411	696.49	21.0571
306.78	19.6454	492.35	0.0000	696.51	21.0571
308.46	25.6567	497.08	8.6505	697.00	20.0081
311.90	18.0054	505.52	7.2403	697.30	21.0636
316.51	20.6475	507.63	0.0000	697.49	21.0653
319.41	17.2428	511.00	9.6810	702.65	15.8319
320.08	10.3506	514.00	9.6960	706.68	16.9147
321.04	18.1263	514.00	9.6960	711.68	16.9486
323.87	23.3525	520.40	11.6729	720.70	15.9454
325.23	18.1810	520.69	0.0000	721.93	0.0000
328.76	16.4909	522.65	0.0000	722.78	8.5114
333.37	15.6742	527.90	0.0000	722.91	10.6396
333.97	18.2943	528.26	11.7188	723.31	14.8978
334.37	22.2207	529.59	18.5671	724.19	14.9029
338.28	22.7183	529.87	0.0000	727.33	7.4606
338.32	22.7188	531.02	7.8232	733.00	7.4771
311.90	23.6283	537.26	17.6572	735.93	10.6938
340.48	23.6283	546.56	0.0000	333.97	12.8398
340.55	23.6294	552.55	10.3770	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	7.5093	949.00	11.5169	1384.29	2.9138
747.24	13.9622	667.71	0.0000	1408.01	4.6875
748.06	16.1151	962.31	5.2044	1434.09	2.9471
752.31	13.9892	964.08	0.0000	1435.80	0.9827
753.82	12.9204	966.17	0.0000	1457.56	0.0000
756.73	14.0125	911.20	6.9534	1460.82	3.9531
756.80	14.0130	983.53	10.4773	1489.16	4.9722
884.68	14.0505	984.45	0.0000	1505.03	3.9917
765.81	15.1422	1274.44	14.0239	1584.12	10.1483
766.42	15.1456	1001.03	7.0222	1596.21	1.0173
766.84	10.8199	1002.74	12.2949	1620.50	2.0449
772.60	0.0000	1004.73	11.4238	1621.92	7.1594
776.52	13.0308	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.0370
778.90	15.2157	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	6.2122	1764.49	1.6829
788.74	13.0894	1038.76	0.0000	1063.66	3.1589
792.07	9.8287	631.29	11.5662	1771.35	1.0532
795.86	15.3102	1048.07	7.1206	1791.20	0.0000
810.06	7.6944	1049.04	9.9723	1808.65	3.1818
810.29	9.8936	1050.41	2.8502	1810.72	0.0000
344.28	9.8943	1063.66	6.2587	1836.06	3.1979
810.76	6.5969	1077.00	8.0782		
815.77	14.3187	1077.34	7.1812		
1048.07	6.6152	1085.87	5.3990		
832.01	12.1857	1093.63	4.5090		
834.85	7.7622	1099.45	7.2261		
835.71	13.3105	1112.07	9.9708		
836.80	0.0000	1112.84	11.7860		
846.75	0.0000	1115.54	18.1470		
846.77	12.2483	1120.29	10.9021		
856.80	13.4082	1120.55	10.9028		
860.56	4.4751	1221.41	18.1750		
871.09	10.1049	1129.67	9.1089		
873.19	4.4943	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	6.7556	1173.23	14.7461		
880.51	11.2634	1177.95	9.2279		
881.60	6.7605	1189.05	8.3298		
883.24	11.2736	1204.77	10.2225		
884.68	10.1514	1221.41	5.9734		
889.28	10.1667	1231.02	5.9883		
894.76	7.9220	1235.36	14.0506		
898.04	14.7282	1238.28	4.6869		
900.72	4.5356	1260.41	0.0000		
903.28	10.2140	1271.87	8.8229		
911.20	3.4135	1274.44	7.5674		
912.08	3.4144	1274.54	7.5679		
923.98	0.0000	1291.59	2.8499		
926.50	6.8608	1298.22	0.0000		
929.11	5.7222	1312.11	7.6377		
935.54	3.4403	1332.49	7.6753		
937.49	9.1800	1362.66	0.0000		
944.13	11.4994	1365.19	4.8346		
946.00	11.5059	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:30.71

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724002.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM30.CNF;654
Background date : 26-FEB-2023 09:14:17
Sample date : 20-JAN-2023 11:00:00 Acquisition date : 28-FEB-2023 05:06:43
Sample ID : G609724002 Sample quantity : 1.37480E+02 GRAM
Detector name : GAM30 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.17 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2379916 Detector SN# :
Matrix Spike ID : LCS ID :

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	52.10	70	150	8.73	104.75	95	20	1.94E-02	44.5	
2	2	74.84*	64	104	1.22	150.26	147	13	1.78E-02	29.7	1.19E+00
3	2	77.05*	115	93	1.23	154.70	147	13	3.20E-02	17.6	
4	0	86.91	38	104	0.77	174.43	172	7	1.06E-02	47.0	
5	0	92.82*	38	98	0.94	186.28	184	8	1.07E-02	51.6	
6	0	160.60	30	59	1.74	321.98	318	9	8.22E-03	50.2	
7	2	185.84*	35	61	1.41	372.51	367	17	9.66E-03	44.5	1.85E+00
8	2	187.83	22	55	1.41	376.49	367	17	6.06E-03	70.1	
9	4	238.64*	153	56	1.14	478.23	472	17	4.24E-02	11.7	2.35E+00
10	4	240.99	23	50	1.17	482.93	472	17	6.41E-03	69.3	
11	4	242.07	30	47	1.14	485.10	472	17	8.36E-03	47.0	
12	0	271.70	31	82	4.16	544.41	537	17	8.73E-03	68.0	
13	0	295.40	118	33	1.10	591.87	587	11	3.28E-02	13.2	
14	0	338.71*	32	31	1.83	678.58	675	9	9.00E-03	36.8	
15	0	351.78*	181	21	1.24	704.75	698	14	5.02E-02	9.3	
16	0	356.48	8	15	0.60	714.17	711	7	2.30E-03	83.2	
17	0	410.59	16	27	1.63	822.50	814	11	4.38E-03	69.1	
18	0	511.10*	12	35	2.77	1023.75	1017	15	3.29E-03	145.8	
19	0	529.30	10	9	1.63	1060.18	1056	7	2.73E-03	62.3	
20	0	575.82	6	10	0.87	1153.33	1151	7	1.65E-03	94.2	
21	0	583.07*	55	27	1.62	1167.85	1162	12	1.52E-02	24.0	
22	2	604.67	23	18	1.83	1211.09	1204	38	6.41E-03	43.4	1.49E+00
23	2	609.18*	103	21	1.59	1220.11	1204	38	2.86E-02	13.2	
24	0	656.86	11	9	2.16	1315.58	1310	9	3.13E-03	56.4	
25	0	723.14*	12	27	3.50	1448.29	1438	14	3.36E-03	97.7	
26	0	881.88	14	9	1.23	1766.14	1759	12	3.92E-03	50.1	
27	0	912.47*	19	29	1.96	1827.39	1818	13	5.39E-03	63.6	
28	0	969.10	18	10	0.85	1940.79	1937	7	4.93E-03	38.4	
29	0	1070.95	9	1	0.95	2144.71	2142	6	2.43E-03	40.0	
30	0	1119.83*	27	12	2.59	2242.58	2236	12	7.58E-03	32.6	
31	0	1128.46	8	6	1.42	2259.87	2252	11	2.08E-03	70.7	
32	0	1158.35	10	6	1.10	2319.71	2315	9	2.65E-03	58.6	
33	0	1219.73	14	6	0.55	2442.63	2438	11	3.75E-03	43.3	
34	0	1460.72*	290	0	1.91	2925.17	2919	15	8.05E-02	5.9	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1729.88	13	0	0.73	3464.15	3459	10	3.61E-03	27.7	
36	0	1764.74*	21	0	1.79	3533.96	3529	9	5.75E-03	23.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:07:32

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724002.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 20-JAN-2023 11:00:00	Acquisition date	: 28-FEB-2023 05:06:43
Sample ID	: G609724002	Sample quantity	: 137.48 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA30	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:01.17 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	277	10.66*	1.291E+00	1.100E+01	1.100E+01	11.88
AS-73	53.44	86	10.30*	2.099E+00	2.178E+00	3.044E+00	88.99
RB-84	881.60	14	68.90*	2.001E+00	5.580E-02	1.266E-01	100.24
CD-109	88.03	45	3.70*	6.713E+00	9.949E-01	1.055E+00	94.01
AG-110	657.50	12	4.50*	2.581E+00	5.411E-01	6.026E-01	112.79
SN-126	64.28	------	9.60	4.127E+00	------	Line Not Found	------
	86.94	45	8.90	6.713E+00	4.136E-01	4.136E-01	94.01
	87.57	45	37.00*	6.713E+00	9.949E-02	9.949E-02	94.01
TM-171	51.35	86	0.27	2.099E+00	8.308E+01	8.632E+01	88.99
	52.39	86	0.47*	2.099E+00	4.773E+01	4.959E+01	88.99
	66.73	------	0.14	4.504E+00	------	Line Not Found	------
TL-208	277.37	------	6.60	4.980E+00	------	Line Not Found	------
	583.19	56	85.00*	2.846E+00	1.274E-01	1.274E-01	47.91
	860.56	------	12.50	2.045E+00	------	Line Not Found	------
BI-211	72.87	------	1.23	5.352E+00	------	Line Not Found	------
	351.06	194	12.92*	4.193E+00	1.957E+00	1.957E+00	18.66
PB-212	74.82	77	10.28	5.591E+00	7.329E-01	7.329E-01	59.42
	77.11	138	17.10	5.841E+00	7.546E-01	7.546E-01	35.28
	238.63	169	43.60*	5.529E+00	3.825E-01	3.825E-01	23.40
	300.09	------	3.30	4.707E+00	------	Line Not Found	------
BI-214	609.32	106	45.49*	2.746E+00	4.631E-01	4.631E-01	26.31
	1120.29	27	14.92	1.616E+00	6.045E-01	6.045E-01	65.10
	1764.49	19	15.30	1.134E+00	6.129E-01	6.129E-01	47.40
PB-214	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.080E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
RN-222	609.32	106	45.49*	2.746E+00	4.631E-01	4.631E-01	26.31
	1120.29	27	14.92	1.616E+00	6.045E-01	6.045E-01	65.10
	1764.49	19	15.30	1.134E+00	6.129E-01	6.129E-01	47.40
RA-224	240.99	26	4.10*	5.492E+00	6.191E-01	6.191E-01	138.55
RA-226	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.080E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
AC-228	105.21	------	1.10	7.480E+00	------	Line Not Found	------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------	Line Not Found	------
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73
RA-228	105.21	------	1.10	7.480E+00	------	Line Not Found	------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------	Line Not Found	------
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	77	10.28	5.591E+00	7.329E-01	7.329E-01	59.42
	77.11	138	17.10	5.841E+00	7.546E-01	7.546E-01	35.28
	238.63	169	43.60*	5.529E+00	3.825E-01	3.825E-01	23.40
	300.09	------	3.30	4.707E+00	------ Line Not Found		------
TH-230	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.079E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
TH-232	105.21	------	1.10	7.480E+00	------ Line Not Found		------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------ Line Not Found		------
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73
U-234	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.079E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
AM-243	43.53	------	5.90	8.649E-01	------ Line Not Found		------
	74.66	77	67.20*	5.591E+00	1.121E-01	1.121E-01	59.42
ANH-511	511.00	12	100.00*	3.160E+00	2.138E-02	2.138E-02	291.64

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:33.20

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724002.CNF;1		
Acquisition date	: 28-FEB-2023 05:06:43	Sensitivity	: 3.000
Detector ID	: GAM30	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.17	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Analyst initials	: RXF2
Sample ID	: G609724002	Sample Quantity	: 1.3748E+02 GRAM
Batch Number	: 2379916	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2022 10:46:20	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;14		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.100E+01	1.281E+00	3.657E-01
AS-73	3.044E+00	2.654E+00	1.042E+00
RB-84	1.266E-01	1.243E-01	1.659E-01
CD-109	1.055E+00	9.715E-01	1.089E+00
AG-110	6.026E-01	6.660E-01	1.169E+00
SN-126	9.949E-02	9.166E-02	9.368E-02
TM-171	4.959E+01	4.325E+01	1.834E+01
TL-208	1.274E-01	5.981E-02	4.912E-02
BI-211	1.957E+00	3.577E-01	1.753E-01
PB-212	3.825E-01	8.773E-02	7.701E-02
BI-214	4.631E-01	1.194E-01	9.807E-02
PB-214	7.101E-01	1.298E-01	6.376E-02
RN-222	4.631E-01	1.194E-01	9.807E-02
RA-224	6.191E-01	8.406E-01	8.250E-01
RA-226	7.101E-01	1.298E-01	6.376E-02
AC-228	2.105E-01	2.624E-01	2.103E-01
RA-228	2.105E-01	2.624E-01	2.103E-01
TH-228	3.825E-01	8.773E-02	7.701E-02
TH-230	7.101E-01	1.298E-01	6.376E-02
TH-232	2.105E-01	2.624E-01	2.103E-01
U-234	7.101E-01	1.298E-01	6.376E-02
AM-243	1.121E-01	6.528E-02	6.346E-02
ANH-511	2.138E-02	6.111E-02	4.273E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	3.165E-01	3.149E-01	6.984E-01	NOT IDENT.
NA-22	-2.224E-02	2.672E-02	4.515E-02	NOT IDENT.
NA-24	0.000E+00	7.378E+16	0.000E+00	SHORT HLIF
AL-26	-6.567E-03	2.146E-02	4.349E-02	FAIL ABUN
SC-46	-3.395E-03	2.710E-02	5.343E-02	FAIL ABUN
V-48	3.437E-02	1.208E-01	2.579E-01	NOT IDENT.
CR-51	-2.982E-02	4.669E-01	9.219E-01	NOT IDENT.

MN-52	-1.334E+00	2.623E+00	4.933E+00	NOT IDENT.
MN-54	2.275E-02	2.731E-02	6.078E-02	NOT IDENT.
CO-56	-1.478E-02	3.394E-02	6.052E-02	NOT IDENT.
MN-56	0.000E+00	1.866E+41	0.000E+00	SHORT HLIF
CO-57	-2.738E-03	1.728E-02	3.197E-02	NOT IDENT.
CO-58	2.554E-03	3.534E-02	7.003E-02	NOT IDENT.
FE-59	3.600E-02	9.478E-02	2.061E-01	NOT IDENT.
CO-60	1.484E-02	3.349E-02	7.335E-02	NOT IDENT.
ZN-65	2.359E-02	5.373E-02	1.155E-01	NOT IDENT.
GE-68	1.249E+00	9.266E-01	2.320E+00	NOT IDENT.
AS-74	1.108E-01	1.700E-01	3.592E-01	NOT IDENT.
SE-75	8.650E-03	3.346E-02	6.880E-02	NOT IDENT.
BR-77	0.000E+00	1.350E+04	0.000E+00	SHORT HLIF
SR-82	-2.808E-01	4.179E-01	7.086E-01	NOT IDENT.
RB-83	-2.241E-02	4.954E-02	9.231E-02	FAIL ABUN
KR-85	3.147E+00	4.263E+00	8.912E+00	NOT IDENT.
SR-85	2.135E-02	2.896E-02	6.054E-02	NOT IDENT.
RB-86	1.561E+00	1.392E+00	3.347E+00	NOT IDENT.
Y-88	1.375E-03	3.216E-02	7.145E-02	NOT IDENT.
Y-91	-4.164E+00	2.124E+01	4.132E+01	NOT IDENT.
NB-94	2.710E-03	2.373E-02	4.709E-02	NOT IDENT.
NB-95	6.545E-03	4.133E-02	8.129E-02	NOT IDENT.
NB-95M	-1.953E-02	1.249E-01	2.023E-01	NOT IDENT.
ZR-95	2.597E-02	5.422E-02	1.197E-01	FAIL ABUN
NB-97	0.000E+00	1.105E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.744E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.873E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-6.257E-03	2.178E-02	3.948E-02	NOT IDENT.
RH-102	2.979E-02	3.907E-02	8.571E-02	NOT IDENT.
RU-103	1.390E-02	3.572E-02	7.669E-02	FAIL ABUN
RH-106	1.628E-02	2.686E-01	4.756E-01	NOT IDENT.
RU-106	1.628E-02	2.686E-01	4.756E-01	NOT IDENT.
AG-108M	-5.723E-03	1.931E-02	3.697E-02	FAIL ABUN
AG-110M	4.494E-02	3.203E-02	8.103E-02	FAIL ABUN
SN-113	-1.226E-02	3.349E-02	6.368E-02	NOT IDENT.
CD-115	0.000E+00	1.400E+04	0.000E+00	SHORT HLIF
SN-117M	2.151E-03	1.289E-01	2.208E-01	NOT IDENT.
SB-122	0.000E+00	5.288E+02	0.000E+00	SHORT HLIF
TE-123M	1.074E-02	2.278E-02	4.138E-02	NOT IDENT.
SB-124	-1.616E-02	6.822E-02	1.432E-01	FAIL ABUN
SB-125	3.165E-02	6.438E-02	1.353E-01	NOT IDENT.
TE-125M	-1.978E+00	7.979E+00	1.472E+01	NOT IDENT.
I-126	7.517E-02	5.667E-01	1.127E+00	NOT IDENT.
SB-126	2.157E-01	4.547E-01	9.271E-01	NOT IDENT.
SB-127	0.000E+00	6.130E+01	0.000E+00	SHORT HLIF
I-131	7.057E-02	5.025E-01	1.043E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.495E+01	0.000E+00	SHORT HLIF
BA-133	1.897E-02	3.094E-02	5.249E-02	FAIL ABUN
I-133	0.000E+00	7.484E+11	0.000E+00	SHORT HLIF
CS-134	1.994E-02	3.074E-02	6.602E-02	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	1.224E-01	2.371E-01	5.427E-01	NOT IDENT.
BA-137M	2.881E-02	2.409E-02	5.604E-02	NOT IDENT.
CS-137	3.043E-02	2.545E-02	5.920E-02	NOT IDENT.
LA-138	9.793E-04	2.481E-02	6.024E-02	NOT IDENT.
CE-139	-3.607E-03	1.983E-02	3.620E-02	NOT IDENT.
BA-140	-6.425E-02	5.599E-01	1.111E+00	NOT IDENT.
LA-140	3.817E-02	2.015E-01	4.674E-01	NOT IDENT.
CE-141	8.465E-03	6.934E-02	1.302E-01	NOT IDENT.
CE-143	0.000E+00	1.186E+07	0.000E+00	SHORT HLIF
CE-144	-3.488E-02	1.277E-01	2.327E-01	NOT IDENT.
PM-144	6.665E-03	2.419E-02	4.966E-02	NOT IDENT.
PR-144	5.050E-01	1.833E+00	3.763E+00	NOT IDENT.
PM-146	2.737E-02	2.689E-02	6.118E-02	NOT IDENT.
ND-147	-5.470E-01	1.853E+00	3.093E+00	NOT IDENT.
PM-147	-2.206E+02	4.614E+02	8.255E+02	NOT IDENT.
PM-149	0.000E+00	9.948E+04	0.000E+00	SHORT HLIF
EU-150	-3.837E-03	1.944E-02	3.600E-02	FAIL ABUN
EU-152	1.510E-02	5.851E-02	1.217E-01	NOT IDENT.
GD-153	2.580E-02	5.475E-02	1.026E-01	NOT IDENT.
EU-154	-8.419E-02	7.949E-02	1.244E-01	FAIL ABUN
EU-155	-5.907E-02	6.141E-02	1.043E-01	FAIL ABUN
TB-160	-1.887E-02	1.505E-01	2.495E-01	FAIL ABUN
HO-166M	-7.935E-03	3.640E-02	6.968E-02	FAIL ABUN
HF-172	-1.155E-01	1.396E-01	2.418E-01	FAIL ABUN
LU-172	9.111E-03	5.191E-02	1.081E-01	FAIL ABUN

LU-176	-3.803E-03	1.684E-02	3.297E-02	FAIL ABUN
HF-181	1.661E-02	3.477E-02	7.688E-02	NOT IDENT.
TA-182	5.125E-02	1.540E-01	3.039E-01	FAIL ABUN
RE-183	-6.021E-02	1.572E-01	2.714E-01	NOT IDENT.
RE-184	-2.360E-02	1.284E-01	2.441E-01	NOT IDENT.
W-188	2.746E+00	6.386E+00	1.225E+01	NOT IDENT.
IR-192	-7.340E-03	2.854E-02	5.547E-02	FAIL ABUN
HG-203	-6.040E-03	3.344E-02	6.600E-02	NOT IDENT.
TL-204	-2.899E+00	3.242E+00	5.730E+00	NOT IDENT.
BI-207	-4.452E-03	4.152E-02	8.295E-02	FAIL ABUN
BI-210	-1.180E+00	1.976E+00	3.364E+00	NOT IDENT.
PB-210	-1.180E+00	1.976E+00	3.364E+00	NOT IDENT.
PB-211	1.891E-02	5.434E-01	9.731E-01	NOT IDENT.
BI-212	5.337E-02	4.386E-01	8.140E-01	NOT IDENT.
BI-213	-2.815E-02	6.323E-02	1.187E-01	NOT IDENT.
RN-219	7.642E-02	2.764E-01	5.668E-01	FAIL ABUN
RA-223	-1.540E-02	4.324E-01	8.577E-01	FAIL ABUN
AC-225	4.309E-02	2.066E+00	3.785E+00	NOT IDENT.
AC-227	-1.211E-01	1.957E-01	3.248E-01	NOT IDENT.
TH-227	-1.211E-01	1.957E-01	3.248E-01	NOT IDENT.
TH-229	1.315E-01	3.558E-01	6.789E-01	FAIL ABUN
PA-231	2.989E-01	3.024E-01	6.660E-01	NOT IDENT.
TH-231	-1.540E-02	4.324E-01	8.577E-01	FAIL ABUN
PA-233	-1.345E-02	4.575E-02	8.762E-02	NOT IDENT.
PA-234	-1.571E-02	2.534E-01	4.770E-01	FAIL ABUN
PA-234M	-3.403E-01	3.838E+00	7.146E+00	NOT IDENT.
TH-234	-1.844E-02	8.064E-01	1.591E+00	FAIL ABUN
U-235	5.799E-02	1.342E-01	2.593E-01	FAIL ABUN
NP-237	-1.345E-02	4.575E-02	8.762E-02	NOT IDENT.
NP-238	0.000E+00	2.992E+04	0.000E+00	SHORT HLIF
U-238	-1.844E-02	8.064E-01	1.591E+00	FAIL ABUN
NP-239	-6.129E-03	1.498E-01	2.840E-01	NOT IDENT.
PU-239	8.679E+01	2.196E+02	4.271E+02	NOT IDENT.
AM-241	3.254E-02	9.426E-02	1.876E-01	NOT IDENT.
CM-243	9.988E-03	6.387E-02	1.234E-01	NOT IDENT.
BK-247	3.501E-03	5.597E-02	1.080E-01	NOT IDENT.
CM-247	1.208E-02	2.454E-02	5.182E-02	NOT IDENT.
CF-249	8.291E-03	2.747E-02	5.646E-02	NOT IDENT.
CF-251	1.918E-02	8.399E-02	1.592E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:31.51

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	277	10.66*	1.291E+00	1.100E+01	1.100E+01	11.88
AS-73	53.44	86	10.30*	2.099E+00	2.178E+00	3.044E+00	88.99
RB-84	881.60	14	68.90*	2.001E+00	5.580E-02	1.266E-01	100.24
CD-109	88.03	45	3.70*	6.713E+00	9.949E-01	1.055E+00	94.01
AG-110	657.50	12	4.50*	2.581E+00	5.411E-01	6.026E-01	112.79
SN-126	64.28	------	9.60	4.127E+00	------	Line Not Found	------
	86.94	45	8.90	6.713E+00	4.136E-01	4.136E-01	94.01
	87.57	45	37.00*	6.713E+00	9.949E-02	9.949E-02	94.01
TM-171	51.35	86	0.27	2.099E+00	8.308E+01	8.632E+01	88.99
	52.39	86	0.47*	2.099E+00	4.773E+01	4.959E+01	88.99
	66.73	------	0.14	4.504E+00	------	Line Not Found	------
TL-208	277.37	------	6.60	4.980E+00	------	Line Not Found	------
	583.19	56	85.00*	2.846E+00	1.274E-01	1.274E-01	47.91
	860.56	------	12.50	2.045E+00	------	Line Not Found	------
BI-211	72.87	------	1.23	5.352E+00	------	Line Not Found	------
	351.06	194	12.92*	4.193E+00	1.957E+00	1.957E+00	18.66
PB-212	74.82	77	10.28	5.591E+00	7.329E-01	7.329E-01	59.42
	77.11	138	17.10	5.841E+00	7.546E-01	7.546E-01	35.28
	238.63	169	43.60*	5.529E+00	3.825E-01	3.825E-01	23.40
	300.09	------	3.30	4.707E+00	------	Line Not Found	------
BI-214	609.32	106	45.49*	2.746E+00	4.631E-01	4.631E-01	26.31
	1120.29	27	14.92	1.616E+00	6.045E-01	6.045E-01	65.10
	1764.49	19	15.30	1.134E+00	6.129E-01	6.129E-01	47.40
PB-214	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.080E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
RN-222	609.32	106	45.49*	2.746E+00	4.631E-01	4.631E-01	26.31
	1120.29	27	14.92	1.616E+00	6.045E-01	6.045E-01	65.10
	1764.49	19	15.30	1.134E+00	6.129E-01	6.129E-01	47.40
RA-224	240.99	26	4.10*	5.492E+00	6.191E-01	6.191E-01	138.55
RA-226	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.080E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
AC-228	105.21	------	1.10	7.480E+00	------	Line Not Found	------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------	Line Not Found	------
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73
RA-228	105.21	------	1.10	7.480E+00	------	Line Not Found	------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------	Line Not Found	------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73
TH-228	74.82	77	10.28	5.591E+00	7.329E-01	7.329E-01	59.42
	77.11	138	17.10	5.841E+00	7.546E-01	7.546E-01	35.28
	238.63	169	43.60*	5.529E+00	3.825E-01	3.825E-01	23.40
	300.09	------	3.30	4.707E+00	------ Line Not Found		------
TH-230	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.079E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
TH-232	105.21	------	1.10	7.480E+00	------ Line Not Found		------
	338.32	35	11.27	4.311E+00	3.924E-01	3.924E-01	73.62
	835.71	------	1.61	2.099E+00	------ Line Not Found		------
	911.20	19	25.80*	1.941E+00	2.105E-01	2.105E-01	127.22
	968.97	18	15.80	1.839E+00	3.304E-01	3.304E-01	76.73
U-234	74.82	77	5.80	5.591E+00	1.299E+00	1.299E+00	59.42
	77.11	138	9.70	5.841E+00	1.330E+00	1.330E+00	35.28
	87.09	45	3.41	6.713E+00	1.079E+00	1.079E+00	94.01
	242.00	33	7.25	5.476E+00	4.578E-01	4.578E-01	93.92
	295.22	128	18.42	4.761E+00	8.000E-01	8.000E-01	26.35
	351.93	194	35.60*	4.193E+00	7.101E-01	7.101E-01	18.66
AM-243	43.53	------	5.90	8.649E-01	------ Line Not Found		------
	74.66	77	67.20*	5.591E+00	1.121E-01	1.121E-01	59.42
ANH-511	511.00	12	100.00*	3.160E+00	2.138E-02	2.138E-02	291.64

Flag: "*" = Keyline

Sample ID : G609724002 Acquisition date : 28-FEB-2023 05:06:43

Total number of lines in spectrum 36
Number of unidentified lines 7
Number of lines tentatively identified by NID 29 80.56%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.100E+01	1.100E+01	0.131E+01	11.88	
AS-73	80.30D	1.40	2.178E+00	3.044E+00	2.708E+00	88.99	
RB-84	32.82D	2.27	5.580E-02	1.266E-01	1.269E-01	100.24	
CD-109	461.40D	1.06	9.949E-01	1.055E+00	0.991E+00	94.01	
AG-110	249.76D	1.11	5.411E-01	6.026E-01	6.796E-01	112.79	
SN-126	2.30E+05Y	1.00	9.949E-02	9.949E-02	9.353E-02	94.01	
TM-171	1.92Y	1.04	4.773E+01	4.959E+01	4.413E+01	88.99	
TL-208	1.41E+10Y	1.00	1.274E-01	1.274E-01	0.610E-01	47.91	
BI-211	7.04E+08Y	1.00	1.957E+00	1.957E+00	0.365E+00	18.66	
PB-212	1.41E+10Y	1.00	3.825E-01	3.825E-01	0.895E-01	23.40	
BI-214	1600.00Y	1.00	4.631E-01	4.631E-01	1.219E-01	26.31	
PB-214	1600.00Y	1.00	7.101E-01	7.101E-01	1.325E-01	18.66	
RN-222	1600.00Y	1.00	4.631E-01	4.631E-01	1.219E-01	26.31	
RA-224	1.41E+10Y	1.00	6.191E-01	6.191E-01	8.578E-01	138.55	
RA-226	1600.00Y	1.00	7.101E-01	7.101E-01	1.325E-01	18.66	
AC-228	1.41E+10Y	1.00	2.105E-01	2.105E-01	2.678E-01	127.22	
RA-228	1.41E+10Y	1.00	2.105E-01	2.105E-01	2.678E-01	127.22	
TH-228	1.41E+10Y	1.00	3.825E-01	3.825E-01	0.895E-01	23.40	
TH-230	7.54E+04Y	1.00	7.101E-01	7.101E-01	1.325E-01	18.66	
TH-232	1.41E+10Y	1.00	2.105E-01	2.105E-01	2.678E-01	127.22	
U-234	2.45E+05Y	1.00	7.101E-01	7.101E-01	1.325E-01	18.66	
AM-243	7370.00Y	1.00	1.121E-01	1.121E-01	0.666E-01	59.42	
ANH-511	1.00E+09Y	1.00	2.138E-02	2.138E-02	6.236E-02	291.64	
	Total Activity :		7.060E+01	7.352E+01			

Grand Total Activity : 7.060E+01 7.352E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.82	46	116	0.94	186.28	184	8	1.07E-02	****	7.06E+00	T
0	160.60	34	68	1.74	321.98	318	9	8.22E-03	****	7.00E+00	
2	185.84	39	69	1.41	372.51	367	17	9.66E-03	89.1	6.48E+00	T
2	187.83	25	62	1.41	376.49	367	17	6.06E-03	****	6.44E+00	
0	271.70	34	89	4.16	544.41	537	17	8.73E-03	****	5.05E+00	T
0	356.48	9	16	0.60	714.17	711	7	2.30E-03	****	4.15E+00	T
0	410.59	17	29	1.63	822.50	814	11	4.38E-03	****	3.74E+00	T
0	529.30	10	10	1.63	1060.18	1056	7	2.73E-03	****	3.07E+00	T
0	575.82	6	10	0.87	1153.33	1151	7	1.65E-03	****	2.87E+00	
2	604.67	24	19	1.83	1211.09	1204	38	6.41E-03	86.7	2.76E+00	T
0	723.14	12	28	3.50	1448.29	1438	14	3.36E-03	****	2.38E+00	T
0	1070.95	9	1	0.95	2144.71	2142	6	2.43E-03	80.0	1.68E+00	
0	1128.46	7	5	1.42	2259.87	2252	11	2.08E-03	****	1.61E+00	T
0	1158.35	9	6	1.10	2319.71	2315	9	2.65E-03	****	1.57E+00	
0	1219.73	13	5	0.55	2442.63	2438	11	3.75E-03	86.5	1.50E+00	
0	1729.88	12	0	0.73	3464.15	3459	10	3.61E-03	55.5	1.15E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:42.67

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*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                *
*                          DETECTOR AND SAMPLE DATA                              *
*                                                                                *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724002.CNF;1       *
* Acquisition date : 28-FEB-2023 05:06:43 Sensitivity     : 3.000                *
* Detector ID      : GAM30                Energy tolerance: 1.500                *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000               *
* Elapsed real time:    0 01:00:01.17     Half life ratio : *****                *
* Sample date      : 20-JAN-2023 11:00:00 Nuclide Library : SOLID                *
* Sample ID        : G609724002           Analyst initials: RXF2                 *
* Batch Number     : 2379916              Sample Quantity : 1.3748E+02 GRAM      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000           *
*                                         Dry Weight      :    0.00000           *
*********************************************************************************
*                                                                                *
*                          CALIBRATION INFORMATION                               *
*                                                                                *
* Eff. Cal. date   : 19-SEP-2022 10:46:20 Eff. Geometry   : CAN                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;14                 *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.290E-01
AS-73	4.750E-01
RB-84	7.068E-02
CD-109	5.118E-01
AG-110	5.122E-01
SN-126	4.374E-02
TM-171	8.361E+00
TL-208	2.145E-02
BI-211	7.364E-02
PB-212	3.533E-02
BI-214	4.301E-02
PB-214	2.678E-02
RN-222	4.301E-02
RA-224	3.786E-01
RA-226	2.678E-02
AC-228	9.025E-02
RA-228	9.025E-02
TH-228	3.533E-02
TH-230	2.678E-02
TH-232	9.025E-02
U-234	2.678E-02
AM-243	2.965E-02
ANH-511	1.898E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	3.132E-01	NOT IDENT.
NA-22	1.728E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.513E-02	FAIL ABUN
SC-46	2.153E-02	FAIL ABUN
V-48	1.069E-01	NOT IDENT.
CR-51	4.159E-01	NOT IDENT.
MN-52	1.773E+00	NOT IDENT.

MN-54	2.651E-02	NOT IDENT.
CO-56	2.515E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.467E-02	NOT IDENT.
CO-58	2.991E-02	NOT IDENT.
FE-59	8.840E-02	NOT IDENT.
CO-60	3.127E-02	NOT IDENT.
ZN-65	4.763E-02	NOT IDENT.
GE-68	1.008E+00	NOT IDENT.
AS-74	1.589E-01	NOT IDENT.
SE-75	3.125E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	2.902E-01	NOT IDENT.
RB-83	3.880E-02	FAIL ABUN
KR-85	3.899E+00	NOT IDENT.
SR-85	2.649E-02	NOT IDENT.
RB-86	1.456E+00	NOT IDENT.
Y-88	2.711E-02	NOT IDENT.
Y-91	1.768E+01	NOT IDENT.
NB-94	2.046E-02	NOT IDENT.
NB-95	3.561E-02	NOT IDENT.
NB-95M	9.272E-02	NOT IDENT.
ZR-95	5.067E-02	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.820E-02	NOT IDENT.
RH-102	3.772E-02	NOT IDENT.
RU-103	3.325E-02	FAIL ABUN
RH-106	2.077E-01	NOT IDENT.
RU-106	2.077E-01	NOT IDENT.
AG-108M	1.615E-02	FAIL ABUN
AG-110M	3.478E-02	FAIL ABUN
SN-113	2.803E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.013E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	1.906E-02	NOT IDENT.
SB-124	5.073E-02	FAIL ABUN
SB-125	6.043E-02	NOT IDENT.
TE-125M	6.750E+00	NOT IDENT.
I-126	4.920E-01	NOT IDENT.
SB-126	4.121E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	4.567E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.328E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	2.887E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.295E-01	NOT IDENT.
BA-137M	2.476E-02	NOT IDENT.
CS-137	2.615E-02	NOT IDENT.
LA-138	2.147E-02	NOT IDENT.
CE-139	1.640E-02	NOT IDENT.
BA-140	4.719E-01	NOT IDENT.
LA-140	1.809E-01	NOT IDENT.
CE-141	6.009E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.061E-01	NOT IDENT.
PM-144	2.153E-02	NOT IDENT.
PR-144	1.631E+00	NOT IDENT.
PM-146	2.719E-02	NOT IDENT.
ND-147	1.329E+00	NOT IDENT.
PM-147	3.759E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.618E-02	FAIL ABUN
EU-152	5.409E-02	NOT IDENT.
GD-153	4.719E-02	NOT IDENT.
EU-154	4.735E-02	FAIL ABUN
EU-155	4.715E-02	FAIL ABUN
TB-160	1.068E-01	FAIL ABUN
HO-166M	2.909E-02	FAIL ABUN
HF-172	1.115E-01	FAIL ABUN
LU-172	4.662E-02	FAIL ABUN
LU-176	1.473E-02	FAIL ABUN

HF-181	3.309E-02	NOT IDENT.
TA-182	1.287E-01	FAIL ABUN
RE-183	1.249E-01	NOT IDENT.
RE-184	1.007E-01	NOT IDENT.
W-188	5.545E+00	NOT IDENT.
IR-192	2.481E-02	FAIL ABUN
HG-203	2.964E-02	NOT IDENT.
TL-204	2.667E+00	NOT IDENT.
BI-207	3.557E-02	FAIL ABUN
BI-210	1.533E+00	NOT IDENT.
PB-210	1.533E+00	NOT IDENT.
PB-211	4.335E-01	NOT IDENT.
BI-212	3.596E-01	NOT IDENT.
BI-213	5.112E-02	NOT IDENT.
RN-219	2.532E-01	FAIL ABUN
RA-223	3.861E-01	FAIL ABUN
AC-225	1.724E+00	NOT IDENT.
AC-227	1.471E-01	NOT IDENT.
TH-227	1.471E-01	NOT IDENT.
TH-229	3.120E-01	FAIL ABUN
PA-231	3.027E-01	NOT IDENT.
TH-231	3.861E-01	FAIL ABUN
PA-233	3.949E-02	NOT IDENT.
PA-234	2.055E-01	FAIL ABUN
PA-234M	3.076E+00	NOT IDENT.
TH-234	7.421E-01	FAIL ABUN
U-235	1.201E-01	FAIL ABUN
NP-237	3.949E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	7.421E-01	FAIL ABUN
NP-239	1.291E-01	NOT IDENT.
PU-239	1.973E+02	NOT IDENT.
AM-241	8.731E-02	NOT IDENT.
CM-243	5.672E-02	NOT IDENT.
BK-247	4.907E-02	NOT IDENT.
CM-247	2.314E-02	NOT IDENT.
CF-249	2.528E-02	NOT IDENT.
CF-251	7.290E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:07:46.79

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724002.CNF;1		
Acquisition date	: 28-FEB-2023 05:06:43	Sensitivity	: 3.000
Detector ID	: GAM30	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.17	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Nuclide Library	: SOLID
Sample ID	: G609724002	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 1.3748E+02 GRAM
		Quantity Err(%)	: 1.4548E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 19-SEP-2022 10:46:20	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;14		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.100E+01	1.624E+00	1.624E+00
AS-73	3.044E+00	2.729E+00	2.729E+00
RB-84	1.266E-01	1.248E-01	1.248E-01
CD-109	1.055E+00	9.774E-01	9.774E-01
AG-110	6.026E-01	6.683E-01	6.683E-01
SN-126	9.949E-02	9.206E-02	9.206E-02
TM-171	4.959E+01	4.351E+01	4.351E+01
TL-208	1.274E-01	6.093E-02	6.093E-02
BI-211	1.957E+00	3.908E-01	3.908E-01
PB-212	3.825E-01	9.265E-02	9.265E-02
BI-214	4.631E-01	1.267E-01	1.267E-01
PB-214	7.101E-01	1.414E-01	1.414E-01
RN-222	4.631E-01	1.267E-01	1.267E-01
RA-224	6.191E-01	8.420E-01	8.420E-01
RA-226	7.101E-01	1.414E-01	1.414E-01
AC-228	2.105E-01	2.631E-01	2.631E-01
RA-228	2.105E-01	2.631E-01	2.631E-01
TH-228	3.825E-01	9.265E-02	9.265E-02
TH-230	7.101E-01	1.414E-01	1.414E-01
TH-232	2.105E-01	2.631E-01	2.631E-01
U-234	7.101E-01	1.414E-01	1.414E-01
AM-243	1.121E-01	6.589E-02	6.589E-02
ANH-511	2.138E-02	6.114E-02	6.114E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	3.165E-01	3.161E-01	3.468E-01	NOT IDENT.
NA-22	-2.224E-02	2.679E-02	2.860E-02	NOT IDENT.
NA-24	3.903E+16	7.389E+16	0.000E+00	SHORT HLIF
AL-26	-6.567E-03	2.146E-02	2.166E-02	FAIL ABUN
SC-46	-3.395E-03	2.710E-02	2.714E-02	FAIL ABUN
V-48	3.437E-02	1.208E-01	1.218E-01	NOT IDENT.
CR-51	-2.982E-02	4.670E-01	4.671E-01	NOT IDENT.

MN-52	-1.334E+00	2.626E+00	2.694E+00	NOT IDENT.
MN-54	2.275E-02	2.738E-02	2.924E-02	NOT IDENT.
CO-56	-1.478E-02	3.396E-02	3.461E-02	NOT IDENT.
MN-56	-1.000E+41	1.868E+41	0.000E+00	SHORT HLIF
CO-57	-2.738E-03	1.728E-02	1.732E-02	NOT IDENT.
CO-58	2.554E-03	3.534E-02	3.536E-02	NOT IDENT.
FE-59	3.600E-02	9.485E-02	9.623E-02	NOT IDENT.
CO-60	1.484E-02	3.351E-02	3.417E-02	NOT IDENT.
ZN-65	2.359E-02	5.376E-02	5.480E-02	NOT IDENT.
GE-68	1.249E+00	9.322E-01	1.089E+00	NOT IDENT.
AS-74	1.108E-01	1.705E-01	1.776E-01	NOT IDENT.
SE-75	8.650E-03	3.347E-02	3.370E-02	NOT IDENT.
BR-77	5.887E+04	6.739E+04	7.243E+04	SHORT HLIF
SR-82	-2.808E-01	4.186E-01	4.374E-01	NOT IDENT.
RB-83	-2.241E-02	4.967E-02	5.068E-02	FAIL ABUN
KR-85	3.147E+00	4.272E+00	4.502E+00	NOT IDENT.
SR-85	2.135E-02	2.903E-02	3.058E-02	NOT IDENT.
RB-86	1.561E+00	1.398E+00	1.565E+00	NOT IDENT.
Y-88	1.375E-03	3.216E-02	3.216E-02	NOT IDENT.
Y-91	-4.164E+00	2.124E+01	2.133E+01	NOT IDENT.
NB-94	2.710E-03	2.373E-02	2.377E-02	NOT IDENT.
NB-95	6.545E-03	4.133E-02	4.144E-02	NOT IDENT.
NB-95M	-1.953E-02	1.249E-01	1.252E-01	NOT IDENT.
ZR-95	2.597E-02	5.427E-02	5.552E-02	FAIL ABUN
NB-97	1.000E+41	1.109E+41	0.000E+00	SHORT HLIF
ZR-97	8.414E+15	1.745E+16	0.000E+00	SHORT HLIF
MO-99	1.045E+03	2.875E+03	2.913E+03	SHORT HLIF
TC-99M	-1.000E+41	6.089E+41	0.000E+00	SHORT HLIF
RH-101	-6.257E-03	2.181E-02	2.199E-02	NOT IDENT.
RH-102	2.979E-02	3.922E-02	4.146E-02	NOT IDENT.
RU-103	1.390E-02	3.575E-02	3.629E-02	FAIL ABUN
RH-106	1.628E-02	2.686E-01	2.687E-01	NOT IDENT.
RU-106	1.628E-02	2.686E-01	2.687E-01	NOT IDENT.
AG-108M	-5.723E-03	1.932E-02	1.949E-02	FAIL ABUN
AG-110M	4.494E-02	3.230E-02	3.812E-02	FAIL ABUN
SN-113	-1.226E-02	3.351E-02	3.396E-02	NOT IDENT.
CD-115	1.147E+04	1.405E+04	1.497E+04	SHORT HLIF
SN-117M	2.151E-03	1.289E-01	1.289E-01	NOT IDENT.
SB-122	-2.249E+02	5.292E+02	5.388E+02	SHORT HLIF
TE-123M	1.074E-02	2.279E-02	2.330E-02	NOT IDENT.
SB-124	-1.616E-02	6.823E-02	6.862E-02	FAIL ABUN
SB-125	3.165E-02	6.444E-02	6.600E-02	NOT IDENT.
TE-125M	-1.978E+00	7.980E+00	8.030E+00	NOT IDENT.
I-126	7.517E-02	5.668E-01	5.678E-01	NOT IDENT.
SB-126	2.157E-01	4.555E-01	4.658E-01	NOT IDENT.
SB-127	2.444E+00	6.130E+01	6.131E+01	SHORT HLIF
I-131	7.057E-02	5.026E-01	5.036E-01	NOT IDENT.
I-132	1.000E+41	4.882E+41	0.000E+00	SHORT HLIF
TE-132	1.112E+01	8.496E+01	8.511E+01	SHORT HLIF
BA-133	1.897E-02	3.098E-02	3.214E-02	FAIL ABUN
I-133	6.131E+11	7.646E+11	8.131E+11	SHORT HLIF
CS-134	1.994E-02	3.080E-02	3.208E-02	FAIL ABUN
I-135	-3.413E+40	4.750E+41	0.000E+00	SHORT HLIF
CS-136	1.224E-01	2.375E-01	2.438E-01	NOT IDENT.
BA-137M	2.881E-02	2.424E-02	2.750E-02	NOT IDENT.
CS-137	3.043E-02	2.560E-02	2.905E-02	NOT IDENT.
LA-138	9.793E-04	2.481E-02	2.482E-02	NOT IDENT.
CE-139	-3.607E-03	1.985E-02	1.991E-02	NOT IDENT.
BA-140	-6.425E-02	5.599E-01	5.606E-01	NOT IDENT.
LA-140	3.817E-02	2.015E-01	2.023E-01	NOT IDENT.
CE-141	8.465E-03	6.935E-02	6.945E-02	NOT IDENT.
CE-143	-3.452E+06	1.187E+07	1.197E+07	SHORT HLIF
CE-144	-3.488E-02	1.277E-01	1.287E-01	NOT IDENT.
PM-144	6.665E-03	2.420E-02	2.438E-02	NOT IDENT.
PR-144	5.050E-01	1.833E+00	1.847E+00	NOT IDENT.
PM-146	2.737E-02	2.705E-02	2.973E-02	NOT IDENT.
ND-147	-5.470E-01	1.854E+00	1.870E+00	NOT IDENT.
PM-147	-2.206E+02	4.616E+02	4.722E+02	NOT IDENT.
PM-149	6.414E+02	9.948E+04	9.948E+04	SHORT HLIF
EU-150	-3.837E-03	1.944E-02	1.951E-02	FAIL ABUN
EU-152	1.510E-02	5.852E-02	5.892E-02	NOT IDENT.
GD-153	2.580E-02	5.479E-02	5.601E-02	NOT IDENT.
EU-154	-8.419E-02	7.981E-02	8.837E-02	FAIL ABUN
EU-155	-5.907E-02	6.163E-02	6.714E-02	FAIL ABUN
TB-160	-1.887E-02	1.505E-01	1.508E-01	FAIL ABUN
HO-166M	-7.935E-03	3.640E-02	3.658E-02	FAIL ABUN
HF-172	-1.155E-01	1.410E-01	1.503E-01	FAIL ABUN
LU-172	9.111E-03	5.192E-02	5.208E-02	FAIL ABUN

LU-176	-3.803E-03	1.684E-02	1.693E-02	FAIL ABUN
HF-181	1.661E-02	3.480E-02	3.560E-02	NOT IDENT.
TA-182	5.125E-02	1.541E-01	1.558E-01	FAIL ABUN
RE-183	-6.021E-02	1.574E-01	1.597E-01	NOT IDENT.
RE-184	-2.360E-02	1.284E-01	1.289E-01	NOT IDENT.
W-188	2.746E+00	6.395E+00	6.514E+00	NOT IDENT.
IR-192	-7.340E-03	2.855E-02	2.874E-02	FAIL ABUN
HG-203	-6.040E-03	3.344E-02	3.355E-02	NOT IDENT.
TL-204	-2.899E+00	3.255E+00	3.508E+00	NOT IDENT.
BI-207	-4.452E-03	4.153E-02	4.157E-02	FAIL ABUN
BI-210	-1.180E+00	1.979E+00	2.049E+00	NOT IDENT.
PB-210	-1.180E+00	1.979E+00	2.049E+00	NOT IDENT.
PB-211	1.891E-02	5.434E-01	5.434E-01	NOT IDENT.
BI-212	5.337E-02	4.387E-01	4.393E-01	NOT IDENT.
BI-213	-2.815E-02	6.328E-02	6.454E-02	NOT IDENT.
RN-219	7.642E-02	2.766E-01	2.788E-01	FAIL ABUN
RA-223	-1.540E-02	4.324E-01	4.325E-01	FAIL ABUN
AC-225	4.309E-02	2.066E+00	2.066E+00	NOT IDENT.
AC-227	-1.211E-01	1.965E-01	2.039E-01	NOT IDENT.
TH-227	-1.211E-01	1.965E-01	2.039E-01	NOT IDENT.
TH-229	1.315E-01	3.560E-01	3.609E-01	FAIL ABUN
PA-231	2.989E-01	3.096E-01	3.376E-01	NOT IDENT.
TH-231	-1.540E-02	4.324E-01	4.325E-01	FAIL ABUN
PA-233	-1.345E-02	4.576E-02	4.616E-02	NOT IDENT.
PA-234	-1.571E-02	2.541E-01	2.542E-01	FAIL ABUN
PA-234M	-3.403E-01	3.838E+00	3.841E+00	NOT IDENT.
TH-234	-1.844E-02	8.064E-01	8.064E-01	FAIL ABUN
U-235	5.799E-02	1.343E-01	1.368E-01	FAIL ABUN
NP-237	-1.345E-02	4.576E-02	4.616E-02	NOT IDENT.
NP-238	3.957E+03	2.992E+04	2.998E+04	SHORT HLIF
U-238	-1.844E-02	8.064E-01	8.064E-01	FAIL ABUN
NP-239	-6.129E-03	1.498E-01	1.498E-01	NOT IDENT.
PU-239	8.679E+01	2.197E+02	2.232E+02	NOT IDENT.
AM-241	3.254E-02	9.430E-02	9.543E-02	NOT IDENT.
CM-243	9.988E-03	6.388E-02	6.404E-02	NOT IDENT.
BK-247	3.501E-03	5.597E-02	5.600E-02	NOT IDENT.
CM-247	1.208E-02	2.464E-02	2.523E-02	NOT IDENT.
CF-249	8.291E-03	2.749E-02	2.774E-02	NOT IDENT.
CF-251	1.918E-02	8.402E-02	8.447E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	43.5563	85.43	49.4399	131.20	41.7811
45.60	35.5319	86.55	66.0415	133.02	46.2836
46.54	47.0602	86.79	66.0674	133.52	40.7985
49.72	0.0000	86.94	66.0835	136.00	42.0287
51.35	35.6950	87.09	66.0996	136.47	40.9464
51.87	35.7370	87.57	66.1514	140.51	0.0000
52.39	35.7790	88.03	81.3717	143.76	39.0717
52.97	35.8254	88.34	81.4125	144.24	39.0936
53.44	35.8629	88.47	86.9506	145.44	45.8597
54.07	35.9129	89.96	74.7076	152.43	43.9738
57.36	0.0000	1093.63	72.7109	153.25	45.1428
57.53	50.8509	91.11	74.8444	323.87	44.0619
57.98	52.2042	92.59	58.3481	156.02	37.3581
59.27	57.9071	93.35	58.4174	158.56	40.8691
59.32	57.9129	94.56	37.6246	159.00	36.3457
59.54	53.0294	94.65	37.6298	162.33	54.7170
60.96	60.0790	94.67	37.6309	162.66	54.7361
61.17	66.0165	94.87	37.6427	163.33	36.5171
62.93	64.2741	97.43	34.9909	165.86	34.3277
63.29	50.4667	98.43	32.5908	176.31	31.2340
63.58	47.5257	98.44	32.5915	176.60	37.0293
64.28	64.4471	99.53	43.1752	177.52	35.9057
66.73	54.7935	100.11	41.1048	181.07	0.0000
67.24	66.8144	102.03	40.1648	181.52	31.0116
125.81	69.8649	103.18	39.1739	184.41	32.6561
67.75	69.8740	103.37	40.2437	143.76	32.6984
68.89	63.0236	105.21	46.7228	193.51	36.4776
69.67	64.1182	105.31	46.7295	197.03	47.2260
70.82	81.3238	106.12	43.5941	198.01	33.0889
70.83	81.3257	106.47	42.5522	201.83	43.8816
72.81	65.8358	109.28	45.9263	203.43	42.7593
72.87	65.8428	111.00	39.6134	205.31	45.2137
74.66	67.7422	111.76	0.0000	210.85	33.4841
74.82	67.7616	114.06	35.4804	215.65	42.0362
74.97	67.7795	116.30	0.0000	218.12	34.9061
77.11	68.0382	116.74	34.5305	222.11	20.5341
78.74	54.3144	119.76	37.9205	227.09	43.6718
79.69	55.7640	121.12	43.4158	227.38	43.6827
80.03	50.3526	121.22	43.4213	228.16	0.0000
80.12	50.3609	121.78	42.3670	228.18	35.2132
80.19	50.3669	122.06	44.5560	116.74	35.2132
80.57	43.5889	122.92	44.6060	235.69	43.9920
81.00	50.4369	123.07	42.4384	235.96	44.0019
81.07	50.4429	265.00	49.0062	238.63	41.6497
81.75	53.2310	125.81	57.8774	238.98	0.0000
82.47	61.4960	127.23	52.5123	240.99	41.7311
83.79	46.5663	127.91	41.6083	242.00	41.7659
84.00	47.9527	129.30	41.6814	244.70	31.1885

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	18.5168	563.25	10.8926
252.80	30.9799	345.93	13.2404	564.24	0.0000
254.15	0.0000	351.06	9.2984	569.33	17.8726
256.23	42.2479	351.93	9.3035	946.00	21.8460
260.90	0.0000	355.39	0.0000	569.70	21.8478
264.66	29.1852	356.01	13.3249	583.19	15.9837
264.80	29.1880	364.49	15.1811	584.27	15.9909
265.00	32.0289	366.42	0.0000	595.83	10.0444
269.46	27.6188	372.51	16.1528	427.87	15.0970
270.03	27.6309	375.05	21.5703	602.52	0.0000
271.23	27.6558	377.52	13.5013	604.72	17.1397
273.65	27.7068	356.01	19.8766	607.14	17.1570
276.40	31.5498	388.16	20.8330	609.32	17.1729
277.37	29.0469	388.63	19.9330	610.33	17.1805
277.60	23.9993	391.69	22.6913	614.28	17.2089
278.00	30.3245	264.66	26.4588	618.01	17.2352
279.20	28.6654	401.81	20.0857	620.36	18.2673
279.54	29.5156	402.40	17.3525	621.93	15.2325
279.70	29.5191	404.85	21.9497	630.19	0.0000
280.46	33.7557	410.95	16.5192	631.29	10.1941
283.69	25.3772	413.71	16.5450	633.25	16.3236
284.31	22.8499	414.70	22.0723	634.78	16.3340
285.41	27.1029	423.72	16.6370	635.95	18.3845
285.90	0.0000	427.09	24.0756	636.99	17.3708
287.50	33.0824	427.87	17.6014	657.50	16.9988
290.67	24.2313	433.94	19.5183	657.76	17.0009
293.27	0.0000	439.40	19.5760	657.90	0.0000
351.93	22.1782	440.45	17.7217	661.66	7.2236
295.96	22.1898	453.88	10.3331	664.57	0.0000
879.38	28.2164	463.37	20.7682	666.33	14.4734
299.98	32.0961	468.07	24.6035	666.50	15.5084
300.09	29.5305	473.00	0.0000	667.71	0.0000
300.13	29.5312	475.06	30.3893	677.62	14.5378
301.36	19.7048	476.78	19.9601	685.70	0.0000
302.85	30.0169	477.60	13.3124	692.65	0.0000
256.23	29.1932	482.18	8.5776	695.00	19.8612
304.85	29.2001	487.02	12.4200	696.49	11.5053
306.78	26.6595	492.35	0.0000	696.51	11.5053
308.46	29.2734	497.08	10.5614	697.00	13.5999
311.90	29.3433	505.52	23.1377	697.30	12.5552
316.51	27.7038	507.63	0.0000	697.49	8.3708
319.41	27.7585	511.00	21.2655	702.65	13.6289
320.08	29.5065	514.00	8.7122	706.68	9.4497
321.04	30.3943	514.00	8.7122	711.68	10.5192
323.87	27.8418	520.40	13.5933	720.70	15.8319
325.23	33.9631	520.69	0.0000	721.93	0.0000
328.76	29.6788	522.65	0.0000	722.78	15.8441
333.37	34.1464	527.90	0.0000	722.91	15.8447
333.97	29.4301	528.26	20.4659	723.31	20.6013
334.37	22.3410	529.59	16.0905	724.19	25.3643
338.28	28.9858	529.87	0.0000	727.33	17.7755
338.32	28.9865	531.02	16.1005	733.00	12.7231
311.90	15.8331	537.26	11.7437	735.93	11.6750
340.48	15.8331	546.56	0.0000	333.97	9.5577
340.55	15.8335	552.55	20.6958	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	10.6458	949.00	18.2148	1384.29	6.6808
747.24	17.0514	667.71	0.0000	1408.01	1.9187
748.06	12.7925	962.31	14.8583	1434.09	4.8239
752.31	12.8120	964.08	12.3504	1435.80	1.9303
753.82	8.5459	966.17	6.8655	1457.56	0.0000
756.73	6.4160	911.20	16.0326	1460.82	1.9407
756.80	6.4163	983.53	5.7503	1489.16	1.9523
884.68	17.1536	984.45	0.0000	1505.03	5.8762
765.81	15.0191	1274.44	5.7715	1584.12	5.9711
766.42	15.0225	1001.03	13.8706	1596.21	2.9927
766.84	8.5856	1002.74	8.0952	1620.50	0.0000
772.60	0.0000	1004.73	9.2568	1621.92	1.0026
776.52	12.9219	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	3.0478
778.90	9.6995	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	7.0078	1764.49	4.1191
788.74	11.8956	1038.76	0.0000	1063.66	2.0618
792.07	12.9917	631.29	3.5125	1771.35	3.0932
795.86	9.7566	1048.07	6.1494	1791.20	0.0000
810.06	14.1611	1049.04	11.4234	1808.65	3.1141
810.29	11.9834	1050.41	10.5483	1810.72	0.0000
344.28	11.9843	1063.66	13.2330	1836.06	3.1293
810.76	10.8956	1077.00	5.3126		
815.77	9.8229	1077.34	3.5420		
1048.07	13.1089	1085.87	7.9882		
832.01	15.3626	1093.63	11.5623		
834.85	7.6887	1099.45	8.9081		
835.71	12.0854	1112.07	8.9374		
836.80	0.0000	1112.84	5.1081		
846.75	0.0000	1115.54	4.2940		
846.77	12.1293	1120.29	9.8526		
856.80	16.5942	1120.55	10.7490		
860.56	11.0763	1221.41	9.5566		
871.09	5.5568	1129.67	14.3662		
873.19	12.2331	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	13.3716	1173.23	11.8035		
880.51	11.1471	1177.95	9.9996		
881.60	11.1507	1189.05	9.1162		
883.24	11.7147	1204.77	13.7274		
884.68	1.6743	1221.41	7.3516		
889.28	6.7068	1231.02	8.2897		
894.76	13.4365	1235.36	13.8309		
898.04	6.7251	1238.28	11.9947		
900.72	10.0961	1260.41	0.0000		
903.28	8.9814	1271.87	8.3716		
911.20	12.3799	1274.44	11.1687		
912.08	12.3831	1274.54	9.3073		
923.98	0.0000	1291.59	9.3445		
926.50	5.6537	1298.22	0.0000		
929.11	4.5265	1312.11	2.8169		
935.54	9.0706	1332.49	7.5469		
937.49	10.2107	1362.66	0.0000		
944.13	13.6411	1365.19	4.7516		
946.00	13.6489	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:13.02

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM38.CNF;51
                                    Background date  : 26-FEB-2023 09:14:48
Sample date      : 20-JAN-2023 11:00:00 Acquisition date : 28-FEB-2023 05:07:24
Sample ID        : G609724003           Sample quantity  : 6.48700E+01 GRAM
Detector name    : GAM38                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.21  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2379916              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.43*	132	68	1.09	92.84	88	11	3.67E-02	16.0	
2	0	64.01*	36	64	2.28	128.02	123	9	1.01E-02	47.1	
3	2	74.95*	54	69	0.93	149.90	146	14	1.50E-02	28.9	4.35E-01
4	2	77.16*	90	61	0.98	154.32	146	14	2.49E-02	18.3	
5	4	84.61*	5	59	1.21	169.23	165	27	1.29E-03	291.7	2.78E+00
6	4	87.38*	33	53	1.22	174.77	165	27	9.04E-03	42.3	
7	4	89.89	26	47	1.23	179.78	165	27	7.34E-03	49.5	
8	4	92.87*	12	41	1.24	185.75	165	27	3.30E-03	123.9	
9	0	144.06*	13	57	1.23	288.16	283	11	3.58E-03	118.9	
10	0	159.25	24	21	1.62	318.55	315	7	6.55E-03	38.4	
11	0	186.16*	20	53	0.93	372.38	367	9	5.67E-03	73.4	
12	0	200.72	13	30	1.36	401.52	397	9	3.61E-03	82.1	
13	0	209.26	16	47	3.97	418.61	411	11	4.48E-03	85.7	
14	4	238.59*	86	28	1.28	477.29	471	31	2.38E-02	16.1	1.04E+00
15	4	241.66	36	35	1.66	483.42	471	31	9.93E-03	39.9	
16	0	275.18	17	21	0.67	550.46	547	8	4.62E-03	53.1	
17	0	295.03*	31	24	1.22	590.18	584	12	8.52E-03	37.6	
18	0	316.12	12	19	0.65	632.37	629	10	3.37E-03	71.2	
19	4	323.64	15	13	1.83	647.40	644	17	4.10E-03	49.5	2.14E+00
20	4	327.72	16	28	1.84	655.57	644	17	4.54E-03	61.5	
21	0	338.83*	24	31	2.77	677.81	673	12	6.59E-03	52.1	
22	0	352.00*	68	19	1.47	704.15	700	8	1.88E-02	17.0	
23	0	464.42	10	3	1.11	929.01	926	7	2.88E-03	42.1	
24	0	511.17*	43	15	2.05	1022.51	1013	20	1.19E-02	32.5	
25	0	583.09*	35	15	1.90	1166.36	1159	12	9.82E-03	28.6	
26	0	596.90*	9	2	0.95	1193.98	1190	7	2.63E-03	43.9	
27	0	609.09*	51	13	1.24	1218.37	1214	11	1.42E-02	20.4	
28	0	622.41	11	0	0.98	1245.00	1240	9	3.06E-03	30.2	
29	0	626.57	5	5	0.72	1253.32	1248	7	1.44E-03	84.2	
30	0	643.12	15	8	3.37	1286.42	1280	15	4.11E-03	48.4	
31	0	845.20	9	0	0.73	1690.56	1687	8	2.50E-03	33.3	
32	0	868.83	5	7	3.28	1737.79	1730	9	1.45E-03	100.1	
33	0	910.57*	16	2	0.84	1821.27	1816	10	4.48E-03	33.7	
34	0	949.99	11	0	1.06	1900.09	1895	9	3.06E-03	30.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	969.03	17	2	1.46	1938.16	1933	10	4.61E-03	30.3	
36	0	1120.11	11	5	1.08	2240.23	2233	10	2.95E-03	50.2	
37	0	1460.37*	48	6	1.47	2920.45	2914	11	1.35E-02	17.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:08:14

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724003.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : RXF2
Sample date : 20-JAN-2023 11:00:00 Acquisition date : 28-FEB-2023 05:07:24
Sample ID : G609724003 Sample quantity : 64.870 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA38 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.21 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	7.417E-01	6.472E+00	6.472E+00	35.73	OK
AS-74	595.83	59.00*	1.710E+00	9.445E-02	4.286E-01	87.72	OK
	634.78	15.40	1.611E+00	----- Line Not Found		-----	Absent
RH-106	621.93	9.93*	1.642E+00	6.811E-01	7.321E-01	60.30	OK
	1050.41	1.56	1.000E+00	----- Line Not Found		-----	Absent
RU-106	621.93	9.93*	1.642E+00	6.811E-01	7.321E-01	60.30	OK
	1050.41	1.56	1.000E+00	----- Line Not Found		-----	Absent
CD-109	88.03	3.70*	7.548E+00	1.050E+00	1.113E+00	84.50	OK
SN-117M	156.02	2.11	5.705E+00	----- Line Not Found		-----	Absent
	158.56	86.40*	5.624E+00	4.531E-02	3.270E-01	76.73	OK
TE-123M	159.00	84.00*	5.624E+00	4.661E-02	5.839E-02	76.73	OK
SN-126	64.28	9.60	7.735E+00	4.319E-01	4.319E-01	94.19	OK
	86.94	8.90	7.548E+00	4.365E-01	4.365E-01	84.50	OK
	87.57	37.00*	7.548E+00	1.050E-01	1.050E-01	84.50	OK
CE-141	145.44	48.29*	6.014E+00	2.378E-02	5.435E-02	423.00	OK
TL-208	277.37	6.60	3.568E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	1.749E+00	2.391E-01	2.391E-01	57.11	OK
	860.56	12.50	1.204E+00	----- Line Not Found		-----	Absent
BI-210	46.54	4.25*	7.018E+00	3.837E+00	3.850E+00	32.02	OK
PB-210	46.54	4.25*	7.018E+00	3.837E+00	3.850E+00	32.02	OK
BI-211	72.87	1.23	7.756E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	2.854E+00	1.791E+00	1.791E+00	34.08	OK
PB-212	74.82	10.28	7.741E+00	6.064E-01	6.064E-01	57.73	OK
	77.11	17.10	7.719E+00	6.073E-01	6.073E-01	36.63	OK
	238.63	43.60*	4.082E+00	4.599E-01	4.599E-01	32.22	OK
	300.09	3.30	3.318E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	1.676E+00	6.737E-01	6.738E-01	40.89	OK
	1120.29	14.92	9.430E-01	7.867E-01	7.867E-01	100.49	OK
	1764.49	15.30	6.264E-01	----- Line Not Found		-----	Absent
PB-214	74.82	5.80	7.741E+00	1.075E+00	1.075E+00	57.73	OK
	77.11	9.70	7.719E+00	1.071E+00	1.071E+00	36.63	OK
	87.09	3.41	7.548E+00	1.139E+00	1.139E+00	84.50	OK
	242.00	7.25	4.037E+00	1.170E+00	1.170E+00	79.77	OK
	295.22	18.42	3.371E+00	4.782E-01	4.782E-01	75.15	OK
	351.93	35.60*	2.854E+00	6.500E-01	6.501E-01	34.08	OK
RN-222	609.32	45.49*	1.676E+00	6.737E-01	6.738E-01	40.89	OK
	1120.29	14.92	9.430E-01	7.867E-01	7.867E-01	100.49	OK
	1764.49	15.30	6.264E-01	----- Line Not Found		-----	Absent
RA-224	240.99	4.10*	4.037E+00	2.069E+00	2.069E+00	79.77	OK
RA-226	74.82	5.80	7.741E+00	1.075E+00	1.075E+00	57.73	OK
	77.11	9.70	7.719E+00	1.071E+00	1.071E+00	36.63	OK
	87.09	3.41	7.548E+00	1.139E+00	1.139E+00	84.50	OK
	242.00	7.25	4.037E+00	1.170E+00	1.170E+00	79.77	OK
	295.22	18.42	3.371E+00	4.782E-01	4.782E-01	75.15	OK
	351.93	35.60*	2.854E+00	6.500E-01	6.501E-01	34.08	OK
AC-228	105.21	1.10	7.103E+00	----- Line Not Found		-----	Absent
	338.32	11.27	2.960E+00	6.942E-01	6.942E-01	104.18	OK
	835.71	1.61	1.238E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	968.97	15.80	1.078E+00	1.008E+00	1.008E+00	60.52	OK
RA-228	105.21	1.10	7.103E+00	----- Line Not Found		-----	Absent
	338.32	11.27	2.960E+00	6.942E-01	6.942E-01	104.18	OK
	835.71	1.61	1.238E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46	OK
	968.97	15.80	1.078E+00	1.008E+00	1.008E+00	60.52	OK
TH-228	74.82	10.28	7.741E+00	6.064E-01	6.064E-01	57.73	OK
	77.11	17.10	7.719E+00	6.073E-01	6.073E-01	36.63	OK
	238.63	43.60*	4.082E+00	4.599E-01	4.599E-01	32.22	OK
	300.09	3.30	3.318E+00	----- Line Not Found		-----	Absent
TH-229	85.43	14.70	7.604E+00	3.727E-02	3.727E-02	583.42	OK
	88.47	24.00	7.548E+00	1.619E-01	1.619E-01	84.50	OK
	193.51	4.41*	4.862E+00	----- Line Not Found		-----	Absent
	210.85	2.80	4.535E+00	----- Line Not Found		-----	Absent
TH-230	74.82	5.80	7.741E+00	1.075E+00	1.075E+00	57.73	OK
	77.11	9.70	7.719E+00	1.071E+00	1.071E+00	36.63	OK
	87.09	3.41	7.548E+00	1.139E+00	1.139E+00	84.50	OK
	242.00	7.25	4.037E+00	1.170E+00	1.170E+00	79.77	OK
	295.22	18.42	3.371E+00	4.782E-01	4.782E-01	75.15	OK
	351.93	35.60*	2.854E+00	6.500E-01	6.500E-01	34.08	OK
TH-232	105.21	1.10	7.103E+00	----- Line Not Found		-----	Absent
	338.32	11.27	2.960E+00	6.942E-01	6.942E-01	104.18	OK
	835.71	1.61	1.238E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46	OK
	968.97	15.80	1.078E+00	1.008E+00	1.008E+00	60.52	OK
TH-234	63.29	3.70*	7.735E+00	1.121E+00	1.121E+00	94.19	OK
	92.59	4.23	7.425E+00	3.422E-01	3.422E-01	247.76	OK
U-234	74.82	5.80	7.741E+00	1.075E+00	1.075E+00	57.73	OK
	77.11	9.70	7.719E+00	1.071E+00	1.071E+00	36.63	OK
	87.09	3.41	7.548E+00	1.139E+00	1.139E+00	84.50	OK
	242.00	7.25	4.037E+00	1.170E+00	1.170E+00	79.77	OK
	295.22	18.42	3.371E+00	4.782E-01	4.782E-01	75.15	OK
	351.93	35.60*	2.854E+00	6.500E-01	6.500E-01	34.08	OK
U-235	89.96	3.47	7.494E+00	9.170E-01	9.170E-01	98.94	OK
	93.35	5.60	7.425E+00	2.585E-01	2.585E-01	247.76	OK
	143.76	10.96*	6.022E+00	----- Line Not Found		-----	<<INT Reject
	163.33	5.08	5.525E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.012E+00	6.712E-02	6.712E-02	146.78	OK
	205.31	5.01	4.636E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	7.735E+00	1.121E+00	1.121E+00	94.19	OK
	92.59	4.23	7.425E+00	3.422E-01	3.422E-01	247.76	OK
AM-243	43.53	5.90	6.765E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	7.741E+00	9.276E-02	9.276E-02	57.73	OK
ANH-511	511.00	100.00*	1.988E+00	2.154E-01	2.154E-01	65.07	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:15.26

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724003.CNF;1		
Acquisition date	28-FEB-2023 05:07:24	Sensitivity	3.000
Detector ID	GAM38	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.21	Half life ratio	*****
Sample date	20-JAN-2023 11:00:00	Analyst initials	RXF2
Sample ID	G609724003	Sample Quantity	6.4870E+01 GRAM
Batch Number	2379916	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	31-MAY-2022 06:05:07	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;2		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	6.472E+00	2.266E+00	1.930E+00
AS-74	4.286E-01	3.685E-01	6.417E-01
RH-106	7.321E-01	4.327E-01	2.000E-01
RU-106	7.321E-01	4.327E-01	2.000E-01
CD-109	1.113E+00	9.216E-01	1.106E+00
SN-117M	3.270E-01	2.459E-01	3.966E-01
TE-123M	5.839E-02	4.391E-02	7.100E-02
SN-126	1.050E-01	8.694E-02	1.042E-01
CE-141	5.435E-02	2.253E-01	2.217E-01
TL-208	2.391E-01	1.339E-01	9.987E-02
BI-210	3.850E+00	1.208E+00	7.006E-01
PB-210	3.850E+00	1.208E+00	7.006E-01
BI-211	1.791E+00	5.982E-01	5.822E-01
PB-212	4.599E-01	1.452E-01	1.468E-01
BI-214	6.738E-01	2.700E-01	2.609E-01
PB-214	6.501E-01	2.171E-01	2.119E-01
RN-222	6.738E-01	2.700E-01	2.609E-01
RA-224	2.069E+00	1.617E+00	1.577E+00
RA-226	6.501E-01	2.171E-01	2.119E-01
AC-228	5.641E-01	3.729E-01	4.770E-01
RA-228	5.641E-01	3.729E-01	4.770E-01
TH-228	4.599E-01	1.452E-01	1.468E-01
TH-229	4.129E-01	6.880E-01	1.321E+00
TH-230	6.500E-01	2.171E-01	2.119E-01
TH-232	5.641E-01	3.729E-01	4.770E-01
TH-234	1.121E+00	1.034E+00	9.609E-01
U-234	6.500E-01	2.171E-01	2.119E-01
U-235	1.818E-01	4.236E-01	5.051E-01
U-238	1.121E+00	1.034E+00	9.609E-01
AM-243	9.276E-02	5.247E-02	6.049E-02
ANH-511	2.154E-01	1.374E-01	1.048E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)

BE-7	3.351E-01	7.716E-01	1.596E+00	NOT IDENT.
NA-22	2.232E-02	6.750E-02	1.615E-01	NOT IDENT.
NA-24	0.000E+00	4.243E+17	0.000E+00	SHORT HLIF
AL-26	2.003E-02	8.202E-02	2.004E-01	NOT IDENT.
SC-46	-5.958E-02	7.469E-02	1.234E-01	FAIL ABUN
V-48	2.408E-01	3.206E-01	8.053E-01	NOT IDENT.
CR-51	1.219E-01	1.293E+00	1.882E+00	NOT IDENT.
MN-52	-1.104E+00	1.086E+01	2.174E+01	NOT IDENT.
MN-54	8.305E-03	7.948E-02	1.633E-01	NOT IDENT.
CO-56	2.775E-02	1.049E-01	2.044E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	8.097E-03	3.100E-02	5.756E-02	NOT IDENT.
CO-58	3.566E-02	1.041E-01	2.228E-01	NOT IDENT.
FE-59	-4.037E-02	2.272E-01	4.541E-01	NOT IDENT.
CO-60	2.393E-02	9.252E-02	2.001E-01	NOT IDENT.
ZN-65	-1.053E-02	1.830E-01	3.279E-01	NOT IDENT.
GE-68	-4.217E-01	2.594E+00	5.131E+00	NOT IDENT.
AS-73	1.148E-01	3.418E-01	5.639E-01	NOT IDENT.
SE-75	-3.711E-02	7.067E-02	1.132E-01	NOT IDENT.
BR-77	0.000E+00	2.235E+04	0.000E+00	SHORT HLIF
SR-82	-3.404E-01	1.377E+00	2.455E+00	NOT IDENT.
RB-83	-3.550E-02	1.561E-01	2.877E-01	NOT IDENT.
RB-84	-1.050E-01	2.061E-01	3.781E-01	NOT IDENT.
KR-85	1.052E+01	1.485E+01	3.050E+01	NOT IDENT.
SR-85	7.119E-02	1.009E-01	2.071E-01	NOT IDENT.
RB-86	-1.649E+00	4.047E+00	7.412E+00	NOT IDENT.
Y-88	-4.657E-02	6.861E-02	9.797E-02	NOT IDENT.
Y-91	-7.339E+00	4.646E+01	9.376E+01	NOT IDENT.
NB-94	1.518E-03	6.319E-02	1.217E-01	NOT IDENT.
NB-95	-9.402E-03	1.317E-01	2.384E-01	NOT IDENT.
NB-95M	-2.578E-02	2.316E-01	3.681E-01	NOT IDENT.
ZR-95	-7.796E-02	1.877E-01	3.220E-01	NOT IDENT.
NB-97	0.000E+00	1.684E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.042E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.019E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.434E-02	3.985E-02	6.835E-02	NOT IDENT.
RH-102	3.855E-02	9.513E-02	2.027E-01	NOT IDENT.
RU-103	3.104E-02	1.126E-01	2.259E-01	FAIL ABUN
AG-108M	-2.277E-02	3.968E-02	6.970E-02	NOT IDENT.
AG-110	1.388E+00	1.465E+00	3.336E+00	NOT IDENT.
AG-110M	5.622E-03	7.994E-02	1.765E-01	NOT IDENT.
SN-113	4.228E-02	7.330E-02	1.579E-01	NOT IDENT.
CD-115	0.000E+00	2.909E+04	0.000E+00	SHORT HLIF
SB-122	0.000E+00	1.101E+03	0.000E+00	SHORT HLIF
SB-124	6.551E-03	2.227E-01	5.330E-01	NOT IDENT.
SB-125	1.181E-01	1.642E-01	3.479E-01	FAIL ABUN
TE-125M	-1.215E+01	1.353E+01	2.192E+01	NOT IDENT.
I-126	-3.027E-01	1.549E+00	2.826E+00	NOT IDENT.
SB-126	-9.570E-01	9.780E-01	1.363E+00	NOT IDENT.
SB-127	0.000E+00	1.768E+02	0.000E+00	SHORT HLIF
I-131	-1.683E-02	1.410E+00	2.726E+00	NOT IDENT.
I-132	0.000E+00	1.067E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.670E+02	0.000E+00	SHORT HLIF
BA-133	4.291E-02	7.809E-02	1.531E-01	FAIL ABUN
I-133	0.000E+00	1.564E+12	0.000E+00	SHORT HLIF
CS-134	-6.286E-03	6.518E-02	1.270E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	-5.330E-01	6.390E-01	1.008E+00	NOT IDENT.
BA-137M	1.964E-02	7.372E-02	1.465E-01	NOT IDENT.
CS-137	2.075E-02	7.788E-02	1.548E-01	NOT IDENT.
LA-138	7.915E-02	1.301E-01	3.148E-01	NOT IDENT.
CE-139	3.029E-02	4.355E-02	8.405E-02	NOT IDENT.
BA-140	4.967E-01	1.913E+00	3.802E+00	NOT IDENT.
LA-140	-8.987E-01	6.304E-01	6.447E-01	FAIL ABUN
CE-143	0.000E+00	2.870E+07	0.000E+00	SHORT HLIF
CE-144	-3.943E-02	2.146E-01	3.822E-01	NOT IDENT.
PM-144	2.697E-02	5.878E-02	1.279E-01	NOT IDENT.
PR-144	2.060E+00	4.459E+00	9.705E+00	NOT IDENT.
PM-146	1.224E-02	7.037E-02	1.407E-01	NOT IDENT.
ND-147	3.022E+00	3.855E+00	8.833E+00	FAIL ABUN
PM-147	1.950E+02	8.892E+02	1.638E+03	NOT IDENT.
PM-149	0.000E+00	2.377E+05	0.000E+00	SHORT HLIF
EU-150	4.642E-03	4.091E-02	7.398E-02	FAIL ABUN
EU-152	2.284E-02	1.702E-01	3.031E-01	NOT IDENT.
GD-153	-4.448E-02	8.612E-02	1.357E-01	NOT IDENT.
EU-154	5.451E-02	1.857E-01	4.425E-01	NOT IDENT.

EU-155	2.729E-02	9.500E-02	1.810E-01	FAIL ABUN
TB-160	1.591E-01	3.206E-01	7.251E-01	FAIL ABUN
HO-166M	5.702E-04	1.337E-01	2.509E-01	NOT IDENT.
TM-171	-3.291E+00	6.003E+00	8.579E+00	NOT IDENT.
HF-172	1.235E-01	2.190E-01	4.210E-01	FAIL ABUN
LU-172	-1.221E-01	1.199E-01	1.710E-01	FAIL ABUN
LU-176	-1.988E-02	4.787E-02	7.684E-02	FAIL ABUN
HF-181	5.028E-02	1.299E-01	2.604E-01	NOT IDENT.
TA-182	-1.145E-01	4.369E-01	8.211E-01	FAIL ABUN
RE-183	1.494E-02	8.626E-02	1.634E-01	NOT IDENT.
RE-184	1.499E-01	3.436E-01	7.902E-01	NOT IDENT.
W-188	-4.241E+00	1.235E+01	1.861E+01	FAIL ABUN
IR-192	6.499E-02	9.068E-02	1.137E-01	FAIL ABUN
HG-203	-4.395E-02	9.987E-02	1.452E-01	NOT IDENT.
TL-204	5.187E-01	3.043E+00	5.621E+00	NOT IDENT.
BI-207	-1.781E-02	7.906E-02	1.603E-01	FAIL ABUN
PB-211	-5.195E-01	1.420E+00	2.541E+00	NOT IDENT.
BI-212	3.045E-02	1.281E+00	2.350E+00	NOT IDENT.
BI-213	-6.925E-02	1.837E-01	3.305E-01	NOT IDENT.
RN-219	-2.067E-01	6.982E-01	1.277E+00	NOT IDENT.
RA-223	1.166E+00	1.132E+00	2.283E+00	FAIL ABUN
AC-225	-2.296E+00	4.270E+00	6.913E+00	NOT IDENT.
AC-227	2.163E-01	3.507E-01	6.869E-01	NOT IDENT.
TH-227	2.163E-01	3.507E-01	6.869E-01	NOT IDENT.
PA-231	-1.415E-01	8.229E-01	1.383E+00	NOT IDENT.
TH-231	1.166E+00	1.132E+00	2.283E+00	FAIL ABUN
PA-233	7.758E-02	8.084E-02	1.763E-01	NOT IDENT.
PA-234	3.071E-01	4.608E-01	1.117E+00	FAIL ABUN
PA-234M	-6.875E+00	1.065E+01	1.947E+01	NOT IDENT.
NP-237	7.758E-02	8.084E-02	1.763E-01	NOT IDENT.
NP-238	0.000E+00	7.288E+04	0.000E+00	SHORT HLIF
NP-239	-2.322E-02	3.051E-01	5.450E-01	NOT IDENT.
PU-239	3.199E+02	4.396E+02	8.398E+02	NOT IDENT.
AM-241	4.059E-03	5.933E-02	1.042E-01	NOT IDENT.
CM-243	-2.049E-02	9.007E-02	1.618E-01	NOT IDENT.
BK-247	-1.796E-02	1.135E-01	1.959E-01	FAIL ABUN
CM-247	-2.064E-02	7.141E-02	1.296E-01	NOT IDENT.
CF-249	9.188E-03	6.131E-02	1.221E-01	NOT IDENT.
CF-251	-2.948E-02	1.815E-01	3.138E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:13.78

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	44	10.66*	7.417E-01	6.472E+00	6.472E+00	35.73
AS-74	595.83	8	59.00*	1.710E+00	9.445E-02	4.286E-01	87.72
	634.78	------	15.40	1.611E+00	------ Line Not Found		------
RH-106	621.93	10	9.93*	1.642E+00	6.811E-01	7.321E-01	60.30
	1050.41	------	1.56	1.000E+00	------ Line Not Found		------
RU-106	621.93	10	9.93*	1.642E+00	6.811E-01	7.321E-01	60.30
	1050.41	------	1.56	1.000E+00	------ Line Not Found		------
CD-109	88.03	25	3.70*	7.548E+00	1.050E+00	1.113E+00	84.50
SN-117M	156.02	------	2.11	5.705E+00	------ Line Not Found		------
	158.56	19	86.40*	5.624E+00	4.531E-02	3.270E-01	76.73
TE-123M	159.00	19	84.00*	5.624E+00	4.661E-02	5.839E-02	76.73
SN-126	64.28	28	9.60	7.735E+00	4.319E-01	4.319E-01	94.19
	86.94	25	8.90	7.548E+00	4.365E-01	4.365E-01	84.50
	87.57	25	37.00*	7.548E+00	1.050E-01	1.050E-01	84.50
CE-141	145.44	10	48.29*	6.014E+00	4.126E-02	9.431E-02	237.76
TL-208	277.37	------	6.60	3.568E+00	------ Line Not Found		------
	583.19	31	85.00*	1.749E+00	2.391E-01	2.391E-01	57.11
	860.56	------	12.50	1.204E+00	------ Line Not Found		------
BI-210	46.54	99	4.25*	7.018E+00	3.837E+00	3.850E+00	32.02
PB-210	46.54	99	4.25*	7.018E+00	3.837E+00	3.850E+00	32.02
BI-211	72.87	------	1.23	7.756E+00	------ Line Not Found		------
	351.06	57	12.92*	2.854E+00	1.791E+00	1.791E+00	34.08
PB-212	74.82	42	10.28	7.741E+00	6.064E-01	6.064E-01	57.73
	77.11	69	17.10	7.719E+00	6.073E-01	6.073E-01	36.63
	238.63	71	43.60*	4.082E+00	4.599E-01	4.599E-01	32.22
	300.09	------	3.30	3.318E+00	------ Line Not Found		------
BI-214	609.32	44	45.49*	1.676E+00	6.737E-01	6.738E-01	40.89
	1120.29	10	14.92	9.430E-01	7.867E-01	7.867E-01	100.49
	1764.49	------	15.30	6.264E-01	------ Line Not Found		------
PB-214	74.82	42	5.80	7.741E+00	1.075E+00	1.075E+00	57.73
	77.11	69	9.70	7.719E+00	1.071E+00	1.071E+00	36.63
	87.09	25	3.41	7.548E+00	1.139E+00	1.139E+00	84.50
	242.00	30	7.25	4.037E+00	1.170E+00	1.170E+00	79.77
	295.22	26	18.42	3.371E+00	4.782E-01	4.782E-01	75.15
	351.93	57	35.60*	2.854E+00	6.500E-01	6.501E-01	34.08
RN-222	609.32	44	45.49*	1.676E+00	6.737E-01	6.738E-01	40.89
	1120.29	10	14.92	9.430E-01	7.867E-01	7.867E-01	100.49
	1764.49	------	15.30	6.264E-01	------ Line Not Found		------
RA-224	240.99	30	4.10*	4.037E+00	2.069E+00	2.069E+00	79.77
RA-226	74.82	42	5.80	7.741E+00	1.075E+00	1.075E+00	57.73
	77.11	69	9.70	7.719E+00	1.071E+00	1.071E+00	36.63
	87.09	25	3.41	7.548E+00	1.139E+00	1.139E+00	84.50
	242.00	30	7.25	4.037E+00	1.170E+00	1.170E+00	79.77
	295.22	26	18.42	3.371E+00	4.782E-01	4.782E-01	75.15
	351.93	57	35.60*	2.854E+00	6.500E-01	6.501E-01	34.08
AC-228	105.21	------	1.10	7.103E+00	------ Line Not Found		------
	338.32	20	11.27	2.960E+00	6.942E-01	6.942E-01	104.18

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	835.71	------	1.61	1.238E+00	------ Line Not Found		------
	911.20	14	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46
	968.97	15	15.80	1.078E+00	1.008E+00	1.008E+00	60.52
RA-228	105.21	------	1.10	7.103E+00	------ Line Not Found		------
	338.32	20	11.27	2.960E+00	6.942E-01	6.942E-01	104.18
	835.71	------	1.61	1.238E+00	------ Line Not Found		------
	911.20	14	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46
	968.97	15	15.80	1.078E+00	1.008E+00	1.008E+00	60.52
TH-228	74.82	42	10.28	7.741E+00	6.064E-01	6.064E-01	57.73
	77.11	69	17.10	7.719E+00	6.073E-01	6.073E-01	36.63
	238.63	71	43.60*	4.082E+00	4.599E-01	4.599E-01	32.22
	300.09	------	3.30	3.318E+00	------ Line Not Found		------
TH-229	85.43	4	14.70	7.604E+00	3.727E-02	3.727E-02	583.42
	88.47	25	24.00	7.548E+00	1.619E-01	1.619E-01	84.50
	193.51	------	4.41*	4.862E+00	------ Line Not Found		------
	210.85	------	2.80	4.535E+00	------ Line Not Found		------
TH-230	74.82	42	5.80	7.741E+00	1.075E+00	1.075E+00	57.73
	77.11	69	9.70	7.719E+00	1.071E+00	1.071E+00	36.63
	87.09	25	3.41	7.548E+00	1.139E+00	1.139E+00	84.50
	242.00	30	7.25	4.037E+00	1.170E+00	1.170E+00	79.77
	295.22	26	18.42	3.371E+00	4.782E-01	4.782E-01	75.15
	351.93	57	35.60*	2.854E+00	6.500E-01	6.500E-01	34.08
TH-232	105.21	------	1.10	7.103E+00	------ Line Not Found		------
	338.32	20	11.27	2.960E+00	6.942E-01	6.942E-01	104.18
	835.71	------	1.61	1.238E+00	------ Line Not Found		------
	911.20	14	25.80*	1.142E+00	5.641E-01	5.641E-01	67.46
	968.97	15	15.80	1.078E+00	1.008E+00	1.008E+00	60.52
TH-234	63.29	28	3.70*	7.735E+00	1.121E+00	1.121E+00	94.19
	92.59	9	4.23	7.425E+00	3.422E-01	3.422E-01	247.76
U-234	74.82	42	5.80	7.741E+00	1.075E+00	1.075E+00	57.73
	77.11	69	9.70	7.719E+00	1.071E+00	1.071E+00	36.63
	87.09	25	3.41	7.548E+00	1.139E+00	1.139E+00	84.50
	242.00	30	7.25	4.037E+00	1.170E+00	1.170E+00	79.77
	295.22	26	18.42	3.371E+00	4.782E-01	4.782E-01	75.15
	351.93	57	35.60*	2.854E+00	6.500E-01	6.500E-01	34.08
U-235	89.96	21	3.47	7.494E+00	9.170E-01	9.170E-01	98.94
	93.35	9	5.60	7.425E+00	2.585E-01	2.585E-01	247.76
	143.76	10	10.96*	6.014E+00	1.818E-01	1.818E-01	237.76
	163.33	------	5.08	5.525E+00	------ Line Not Found		------
	185.72	17	57.20	5.012E+00	6.712E-02	6.712E-02	146.78
	205.31	------	5.01	4.636E+00	------ Line Not Found		------
U-238	63.29	28	3.70*	7.735E+00	1.121E+00	1.121E+00	94.19
	92.59	9	4.23	7.425E+00	3.422E-01	3.422E-01	247.76
AM-243	43.53	------	5.90	6.765E+00	------ Line Not Found		------
	74.66	42	67.20*	7.741E+00	9.276E-02	9.276E-02	57.73
ANH-511	511.00	37	100.00*	1.988E+00	2.154E-01	2.154E-01	65.07

Flag: "*" = Keyline

Sample ID : G609724003 Acquisition date : 28-FEB-2023 05:07:24

Total number of lines in spectrum 37
Number of unidentified lines 5
Number of lines tentatively identified by NID 32 86.49%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	6.472E+00	6.472E+00	2.312E+00	35.73	
AS-74	17.77D	4.54	9.445E-02	4.286E-01	3.760E-01	87.72	
RH-106	371.80D	1.07	6.811E-01	7.321E-01	4.415E-01	60.30	
RU-106	371.80D	1.07	6.811E-01	7.321E-01	4.415E-01	60.30	
CD-109	461.40D	1.06	1.050E+00	1.113E+00	0.940E+00	84.50	
SN-117M	13.60D	7.22	4.531E-02	3.270E-01	2.509E-01	76.73	
TE-123M	119.20D	1.25	4.661E-02	5.839E-02	4.481E-02	76.73	
SN-126	2.30E+05Y	1.00	1.050E-01	1.050E-01	0.887E-01	84.50	
CE-141	32.51D	2.29	4.126E-02	9.431E-02	22.42E-02	237.76	
TL-208	1.41E+10Y	1.00	2.391E-01	2.391E-01	1.366E-01	57.11	
BI-210	22.20Y	1.00	3.837E+00	3.850E+00	1.232E+00	32.02	
PB-210	22.20Y	1.00	3.837E+00	3.850E+00	1.232E+00	32.02	
BI-211	7.04E+08Y	1.00	1.791E+00	1.791E+00	0.610E+00	34.08	
PB-212	1.41E+10Y	1.00	4.599E-01	4.599E-01	1.482E-01	32.22	
BI-214	1600.00Y	1.00	6.737E-01	6.738E-01	2.755E-01	40.89	
PB-214	1600.00Y	1.00	6.500E-01	6.501E-01	2.216E-01	34.08	
RN-222	1600.00Y	1.00	6.737E-01	6.738E-01	2.755E-01	40.89	
RA-224	1.41E+10Y	1.00	2.069E+00	2.069E+00	1.650E+00	79.77	
RA-226	1600.00Y	1.00	6.500E-01	6.501E-01	2.216E-01	34.08	
AC-228	1.41E+10Y	1.00	5.641E-01	5.641E-01	3.805E-01	67.46	
RA-228	1.41E+10Y	1.00	5.641E-01	5.641E-01	3.805E-01	67.46	
TH-228	1.41E+10Y	1.00	4.599E-01	4.599E-01	1.482E-01	32.22	
TH-229	7340.00Y	1.00	1.619E-01	1.619E-01	1.368E-01	84.50	K
TH-230	7.54E+04Y	1.00	6.500E-01	6.500E-01	2.215E-01	34.08	
TH-232	1.41E+10Y	1.00	5.641E-01	5.641E-01	3.805E-01	67.46	
TH-234	4.47E+09Y	1.00	1.121E+00	1.121E+00	1.055E+00	94.19	
U-234	2.45E+05Y	1.00	6.500E-01	6.500E-01	2.215E-01	34.08	
U-235	7.04E+08Y	1.00	1.818E-01	1.818E-01	4.322E-01	237.76	
U-238	4.47E+09Y	1.00	1.121E+00	1.121E+00	1.055E+00	94.19	
AM-243	7370.00Y	1.00	9.276E-02	9.276E-02	5.355E-02	57.73	
ANH-511	1.00E+09Y	1.00	2.154E-01	2.154E-01	1.402E-01	65.07	
			---------	---------			
	Total Activity :		3.044E+01	3.131E+01			
	Grand Total Activity :		3.044E+01	3.131E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G609724003 Acquisition date : 28-FEB-2023 05:07:24

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	200.72	11	25	1.36	401.52	397	9	3.61E-03	****	4.72E+00	T
0	209.26	13	38	3.97	418.61	411	11	4.48E-03	****	4.56E+00	
0	275.18	14	18	0.67	550.46	547	8	4.62E-03	****	3.59E+00	T
0	316.12	10	16	0.65	632.37	629	10	3.37E-03	****	3.16E+00	T
4	323.64	12	11	1.83	647.40	644	17	4.10E-03	99.1	3.09E+00	T
4	327.72	14	24	1.84	655.57	644	17	4.54E-03	****	3.06E+00	T
0	464.42	9	2	1.11	929.01	926	7	2.88E-03	84.2	2.18E+00	T
0	626.57	5	4	0.72	1253.32	1248	7	1.44E-03	****	1.63E+00	
0	643.12	13	7	3.37	1286.42	1280	15	4.11E-03	96.7	1.59E+00	
0	845.20	8	0	0.73	1690.56	1687	8	2.50E-03	66.7	1.23E+00	
0	868.83	5	6	3.28	1737.79	1730	9	1.45E-03	****	1.19E+00	
0	949.99	10	0	1.06	1900.09	1895	9	3.06E-03	60.3	1.10E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:25.30

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724003.CNF;1		
Acquisition date	: 28-FEB-2023 05:07:24	Sensitivity	: 3.000
Detector ID	: GAM38	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.21	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Nuclide Library	: SOLID
Sample ID	: G609724003	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 6.4870E+01 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 31-MAY-2022 06:05:07	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;2		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	7.708E-01
AS-74	2.529E-01
RH-106	0.000E+00
RU-106	0.000E+00
CD-109	4.975E-01
SN-117M	1.764E-01
TE-123M	3.158E-02
SN-126	4.684E-02
CE-141	9.916E-02
TL-208	3.976E-02
BI-210	3.015E-01
PB-210	3.015E-01
BI-211	2.506E-01
PB-212	6.503E-02
BI-214	1.106E-01
PB-214	9.120E-02
RN-222	1.106E-01
RA-224	6.988E-01
RA-226	9.120E-02
AC-228	1.868E-01
RA-228	1.868E-01
TH-228	6.503E-02
TH-229	5.912E-01
TH-230	9.119E-02
TH-232	1.868E-01
TH-234	4.295E-01
U-234	9.119E-02
U-235	2.302E-01
U-238	4.295E-01
AM-243	2.744E-02
ANH-511	4.483E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

BE-7	6.853E-01	NOT IDENT.
NA-22	6.195E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	7.501E-02	NOT IDENT.
SC-46	4.373E-02	FAIL ABUN
V-48	3.255E-01	NOT IDENT.
CR-51	8.136E-01	NOT IDENT.
MN-52	8.380E+00	NOT IDENT.
MN-54	6.828E-02	NOT IDENT.
CO-56	8.459E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.591E-02	NOT IDENT.
CO-58	9.389E-02	NOT IDENT.
FE-59	1.755E-01	NOT IDENT.
CO-60	8.075E-02	NOT IDENT.
ZN-65	1.283E-01	NOT IDENT.
GE-68	2.030E+00	NOT IDENT.
AS-73	2.555E-01	NOT IDENT.
SE-75	4.808E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.009E+00	NOT IDENT.
RB-83	1.204E-01	NOT IDENT.
RB-84	1.465E-01	NOT IDENT.
KR-85	1.348E+01	NOT IDENT.
SR-85	9.152E-02	NOT IDENT.
RB-86	2.942E+00	NOT IDENT.
Y-88	1.590E-02	NOT IDENT.
Y-91	3.632E+01	NOT IDENT.
NB-94	5.044E-02	NOT IDENT.
NB-95	1.020E-01	NOT IDENT.
NB-95M	1.619E-01	NOT IDENT.
ZR-95	1.298E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.076E-02	NOT IDENT.
RH-102	8.430E-02	NOT IDENT.
RU-103	9.686E-02	FAIL ABUN
AG-108M	2.771E-02	NOT IDENT.
AG-110	1.427E+00	NOT IDENT.
AG-110M	6.839E-02	NOT IDENT.
SN-113	6.759E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SB-122	0.000E+00	SHORT HLIF
SB-124	1.889E-01	NOT IDENT.
SB-125	1.520E-01	FAIL ABUN
TE-125M	9.713E+00	NOT IDENT.
I-126	1.174E+00	NOT IDENT.
SB-126	5.071E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.173E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	6.794E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.928E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.571E-01	NOT IDENT.
BA-137M	6.234E-02	NOT IDENT.
CS-137	6.586E-02	NOT IDENT.
LA-138	1.263E-01	NOT IDENT.
CE-139	3.791E-02	NOT IDENT.
BA-140	1.632E+00	NOT IDENT.
LA-140	1.286E-01	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	1.679E-01	NOT IDENT.
PM-144	5.281E-02	NOT IDENT.
PR-144	4.009E+00	NOT IDENT.
PM-146	5.982E-02	NOT IDENT.
ND-147	3.721E+00	FAIL ABUN
PM-147	7.392E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.178E-02	FAIL ABUN
EU-152	1.321E-01	NOT IDENT.
GD-153	6.010E-02	NOT IDENT.
EU-154	1.686E-01	NOT IDENT.
EU-155	8.052E-02	FAIL ABUN

TB-160	3.004E-01	FAIL ABUN
HO-166M	1.060E-01	NOT IDENT.
TM-171	3.855E+00	NOT IDENT.
HF-172	1.897E-01	FAIL ABUN
LU-172	5.931E-02	FAIL ABUN
LU-176	3.350E-02	FAIL ABUN
HF-181	1.135E-01	NOT IDENT.
TA-182	3.283E-01	FAIL ABUN
RE-183	7.351E-02	NOT IDENT.
RE-184	3.209E-01	NOT IDENT.
W-188	7.706E+00	FAIL ABUN
IR-192	4.858E-02	FAIL ABUN
HG-203	6.342E-02	NOT IDENT.
TL-204	2.568E+00	NOT IDENT.
BI-207	5.941E-02	FAIL ABUN
PB-211	1.111E+00	NOT IDENT.
BI-212	1.014E+00	NOT IDENT.
BI-213	1.400E-01	NOT IDENT.
RN-219	5.479E-01	NOT IDENT.
RA-223	1.020E+00	FAIL ABUN
AC-225	3.021E+00	NOT IDENT.
AC-227	3.025E-01	NOT IDENT.
TH-227	3.025E-01	NOT IDENT.
PA-231	6.072E-01	NOT IDENT.
TH-231	1.020E+00	FAIL ABUN
PA-233	7.603E-02	NOT IDENT.
PA-234	4.433E-01	FAIL ABUN
PA-234M	7.998E+00	NOT IDENT.
NP-237	7.603E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.452E-01	NOT IDENT.
PU-239	3.836E+02	NOT IDENT.
AM-241	4.680E-02	NOT IDENT.
CM-243	7.106E-02	NOT IDENT.
BK-247	8.457E-02	FAIL ABUN
CM-247	5.651E-02	NOT IDENT.
CF-249	5.232E-02	NOT IDENT.
CF-251	1.404E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:29.48

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724003.CNF;1   *
* Acquisition date : 28-FEB-2023 05:07:24 Sensitivity     : 3.000           *
* Detector ID      : GAM38                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.21     Half life ratio : *****           *
* Sample date      : 20-JAN-2023 11:00:00 Nuclide Library : SOLID           *
* Sample ID        : G609724003           Analyst initials: RXF2            *
* Batch Number     : 2379916              Sample Quantity : 6.4870E+01 GRAM *
*                                         Quantity Err(%) : 1.5415E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 31-MAY-2022 06:05:07 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM38_CAN.CNF;2             *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	6.472E+00	2.332E+00	2.332E+00
AS-74	4.286E-01	3.719E-01	3.719E-01
RH-106	7.321E-01	4.397E-01	4.397E-01
RU-106	7.321E-01	4.397E-01	4.397E-01
CD-109	1.113E+00	9.282E-01	9.282E-01
SN-117M	3.270E-01	2.476E-01	2.476E-01
TE-123M	5.839E-02	4.421E-02	4.421E-02
SN-126	1.050E-01	8.739E-02	8.739E-02
CE-141	5.438E-02	2.254E-01	2.254E-01
TL-208	2.391E-01	1.358E-01	1.358E-01
BI-210	3.850E+00	1.258E+00	1.258E+00
PB-210	3.850E+00	1.258E+00	1.258E+00
BI-211	1.791E+00	6.158E-01	6.158E-01
PB-212	4.599E-01	1.503E-01	1.503E-01
BI-214	6.738E-01	2.778E-01	2.778E-01
PB-214	6.501E-01	2.233E-01	2.233E-01
RN-222	6.738E-01	2.778E-01	2.778E-01
RA-224	2.069E+00	1.627E+00	1.627E+00
RA-226	6.501E-01	2.233E-01	2.233E-01
AC-228	5.641E-01	3.759E-01	3.759E-01
RA-228	5.641E-01	3.759E-01	3.759E-01
TH-228	4.599E-01	1.503E-01	1.503E-01
TH-229	4.129E-01	6.890E-01	6.890E-01
TH-230	6.500E-01	2.232E-01	2.232E-01
TH-232	5.641E-01	3.759E-01	3.759E-01
TH-234	1.121E+00	1.064E+00	1.064E+00
U-234	6.500E-01	2.232E-01	2.232E-01
U-235	1.818E-01	4.239E-01	4.239E-01
U-238	1.121E+00	1.064E+00	1.064E+00
AM-243	9.276E-02	5.297E-02	5.297E-02
ANH-511	2.154E-01	1.388E-01	1.388E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)

BE-7	3.351E-01	7.722E-01	7.869E-01	NOT IDENT.
NA-22	2.232E-02	6.752E-02	6.827E-02	NOT IDENT.
NA-24	-1.148E+17	4.245E+17	0.000E+00	SHORT HLIF
AL-26	2.003E-02	8.203E-02	8.253E-02	NOT IDENT.
SC-46	-5.958E-02	7.484E-02	7.951E-02	FAIL ABUN
V-48	2.408E-01	3.211E-01	3.390E-01	NOT IDENT.
CR-51	1.219E-01	1.293E+00	1.294E+00	NOT IDENT.
MN-52	-1.104E+00	1.086E+01	1.087E+01	NOT IDENT.
MN-54	8.305E-03	7.949E-02	7.957E-02	NOT IDENT.
CO-56	2.775E-02	1.049E-01	1.056E-01	NOT IDENT.
MN-56	1.000E+41	3.713E+41	0.000E+00	SHORT HLIF
CO-57	8.097E-03	3.101E-02	3.122E-02	NOT IDENT.
CO-58	3.566E-02	1.041E-01	1.054E-01	NOT IDENT.
FE-59	-4.037E-02	2.272E-01	2.279E-01	NOT IDENT.
CO-60	2.393E-02	9.254E-02	9.317E-02	NOT IDENT.
ZN-65	-1.053E-02	1.830E-01	1.831E-01	NOT IDENT.
GE-68	-4.217E-01	2.594E+00	2.601E+00	NOT IDENT.
AS-73	1.148E-01	3.427E-01	3.465E-01	NOT IDENT.
SE-75	-3.711E-02	7.072E-02	7.268E-02	NOT IDENT.
BR-77	7.079E+04	8.251E+04	8.847E+04	SHORT HLIF
SR-82	-3.404E-01	1.377E+00	1.386E+00	NOT IDENT.
RB-83	-3.550E-02	1.562E-01	1.570E-01	NOT IDENT.
RB-84	-1.050E-01	2.063E-01	2.117E-01	NOT IDENT.
KR-85	1.052E+01	1.489E+01	1.562E+01	NOT IDENT.
SR-85	7.119E-02	1.011E-01	1.061E-01	NOT IDENT.
RB-86	-1.649E+00	4.049E+00	4.116E+00	NOT IDENT.
Y-88	-4.657E-02	6.870E-02	7.183E-02	NOT IDENT.
Y-91	-7.339E+00	4.647E+01	4.658E+01	NOT IDENT.
NB-94	1.518E-03	6.319E-02	6.319E-02	NOT IDENT.
NB-95	-9.402E-03	1.317E-01	1.317E-01	NOT IDENT.
NB-95M	-2.578E-02	2.316E-01	2.319E-01	NOT IDENT.
ZR-95	-7.796E-02	1.878E-01	1.911E-01	NOT IDENT.
NB-97	1.000E+41	1.686E+41	0.000E+00	SHORT HLIF
ZR-97	7.733E+15	4.043E+16	0.000E+00	SHORT HLIF
MO-99	-1.103E+03	1.019E+04	1.020E+04	SHORT HLIF
TC-99M	-1.000E+41	3.690E+41	0.000E+00	SHORT HLIF
RH-101	-1.434E-02	3.995E-02	4.047E-02	NOT IDENT.
RH-102	3.855E-02	9.524E-02	9.681E-02	NOT IDENT.
RU-103	3.104E-02	1.126E-01	1.135E-01	FAIL ABUN
AG-108M	-2.277E-02	3.973E-02	4.104E-02	NOT IDENT.
AG-110	1.388E+00	1.471E+00	1.598E+00	NOT IDENT.
AG-110M	5.622E-03	7.995E-02	7.999E-02	NOT IDENT.
SN-113	4.228E-02	7.338E-02	7.582E-02	NOT IDENT.
CD-115	-1.713E+04	2.915E+04	3.016E+04	SHORT HLIF
SB-122	-7.713E+02	1.104E+03	1.157E+03	SHORT HLIF
SB-124	6.551E-03	2.227E-01	2.228E-01	NOT IDENT.
SB-125	1.181E-01	1.645E-01	1.729E-01	FAIL ABUN
TE-125M	-1.215E+01	1.357E+01	1.464E+01	NOT IDENT.
I-126	-3.027E-01	1.550E+00	1.556E+00	NOT IDENT.
SB-126	-9.570E-01	9.860E-01	1.076E+00	NOT IDENT.
SB-127	9.969E+01	1.779E+02	1.835E+02	SHORT HLIF
I-131	-1.683E-02	1.410E+00	1.410E+00	NOT IDENT.
I-132	1.000E+41	2.619E+41	0.000E+00	SHORT HLIF
TE-132	1.068E+02	1.675E+02	1.743E+02	SHORT HLIF
BA-133	4.291E-02	7.817E-02	8.053E-02	FAIL ABUN
I-133	2.946E+11	1.566E+12	1.571E+12	SHORT HLIF
CS-134	-6.286E-03	6.518E-02	6.524E-02	NOT IDENT.
I-135	-1.000E+41	2.264E+41	0.000E+00	SHORT HLIF
CS-136	-5.330E-01	6.416E-01	6.851E-01	NOT IDENT.
BA-137M	1.964E-02	7.374E-02	7.427E-02	NOT IDENT.
CS-137	2.075E-02	7.790E-02	7.846E-02	NOT IDENT.
LA-138	7.915E-02	1.303E-01	1.351E-01	NOT IDENT.
CE-139	3.029E-02	4.404E-02	4.610E-02	NOT IDENT.
BA-140	4.967E-01	1.913E+00	1.926E+00	NOT IDENT.
LA-140	-8.987E-01	6.342E-01	7.526E-01	FAIL ABUN
CE-143	5.856E+06	2.871E+07	2.883E+07	SHORT HLIF
CE-144	-3.943E-02	2.146E-01	2.154E-01	NOT IDENT.
PM-144	2.697E-02	5.884E-02	6.008E-02	NOT IDENT.
PR-144	2.060E+00	4.463E+00	4.559E+00	NOT IDENT.
PM-146	1.224E-02	7.038E-02	7.059E-02	NOT IDENT.
ND-147	3.022E+00	3.866E+00	4.099E+00	FAIL ABUN
PM-147	1.950E+02	8.894E+02	8.937E+02	NOT IDENT.
PM-149	-1.381E+05	2.386E+05	2.466E+05	SHORT HLIF
EU-150	4.642E-03	4.092E-02	4.097E-02	FAIL ABUN
EU-152	2.284E-02	1.702E-01	1.706E-01	NOT IDENT.
GD-153	-4.448E-02	8.621E-02	8.851E-02	NOT IDENT.
EU-154	5.451E-02	1.858E-01	1.874E-01	NOT IDENT.

EU-155	2.729E-02	9.504E-02	9.583E-02	FAIL ABUN
TB-160	1.591E-01	3.209E-01	3.288E-01	FAIL ABUN
HO-166M	5.702E-04	1.337E-01	1.337E-01	NOT IDENT.
TM-171	-3.291E+00	6.010E+00	6.191E+00	NOT IDENT.
HF-172	1.235E-01	2.201E-01	2.270E-01	FAIL ABUN
LU-172	-1.221E-01	1.208E-01	1.328E-01	FAIL ABUN
LU-176	-1.988E-02	4.789E-02	4.872E-02	FAIL ABUN
HF-181	5.028E-02	1.300E-01	1.320E-01	NOT IDENT.
TA-182	-1.145E-01	4.370E-01	4.400E-01	FAIL ABUN
RE-183	1.494E-02	8.628E-02	8.654E-02	NOT IDENT.
RE-184	1.499E-01	3.439E-01	3.505E-01	NOT IDENT.
W-188	-4.241E+00	1.236E+01	1.250E+01	FAIL ABUN
IR-192	6.499E-02	9.081E-02	9.542E-02	FAIL ABUN
HG-203	-4.395E-02	9.992E-02	1.019E-01	NOT IDENT.
TL-204	5.187E-01	3.044E+00	3.053E+00	NOT IDENT.
BI-207	-1.781E-02	7.907E-02	7.948E-02	FAIL ABUN
PB-211	-5.195E-01	1.421E+00	1.440E+00	NOT IDENT.
BI-212	3.045E-02	1.281E+00	1.281E+00	NOT IDENT.
BI-213	-6.925E-02	1.838E-01	1.864E-01	NOT IDENT.
RN-219	-2.067E-01	6.988E-01	7.050E-01	NOT IDENT.
RA-223	1.166E+00	1.137E+00	1.252E+00	FAIL ABUN
AC-225	-2.296E+00	4.277E+00	4.401E+00	NOT IDENT.
AC-227	2.163E-01	3.521E-01	3.653E-01	NOT IDENT.
TH-227	2.163E-01	3.521E-01	3.653E-01	NOT IDENT.
PA-231	-1.415E-01	8.235E-01	8.260E-01	NOT IDENT.
TH-231	1.166E+00	1.137E+00	1.252E+00	FAIL ABUN
PA-233	7.758E-02	8.107E-02	8.829E-02	NOT IDENT.
PA-234	3.071E-01	5.799E-01	5.962E-01	FAIL ABUN
PA-234M	-6.875E+00	1.066E+01	1.111E+01	NOT IDENT.
NP-237	7.758E-02	8.107E-02	8.829E-02	NOT IDENT.
NP-238	7.416E+04	7.312E+04	8.040E+04	SHORT HLIF
NP-239	-2.322E-02	3.051E-01	3.053E-01	NOT IDENT.
PU-239	3.199E+02	4.406E+02	4.636E+02	NOT IDENT.
AM-241	4.059E-03	5.933E-02	5.936E-02	NOT IDENT.
CM-243	-2.049E-02	9.010E-02	9.057E-02	NOT IDENT.
BK-247	-1.796E-02	1.136E-01	1.139E-01	FAIL ABUN
CM-247	-2.064E-02	7.151E-02	7.212E-02	NOT IDENT.
CF-249	9.188E-03	6.132E-02	6.146E-02	NOT IDENT.
CF-251	-2.948E-02	1.815E-01	1.820E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	18.2854	85.43	26.5667	131.20	24.3445
45.60	12.7930	86.55	26.6594	133.02	23.5031
46.54	12.8528	86.79	26.6790	133.52	19.7644
49.72	0.0000	86.94	26.6917	136.00	29.3350
51.35	32.1441	87.09	26.7039	136.47	24.6285
51.87	24.8977	87.57	26.7434	140.51	0.0000
52.39	32.2966	88.03	26.7810	143.76	24.0509
52.97	17.6623	88.34	26.8064	144.24	24.0746
53.44	22.1243	88.47	26.8169	145.44	24.1344
54.07	23.6652	89.96	26.9380	152.43	18.6034
57.36	0.0000	1093.63	26.9929	153.25	29.4214
57.53	24.7717	91.11	27.0308	323.87	35.3727
57.98	24.8184	92.59	27.1494	156.02	17.0916
59.27	28.7324	93.35	27.2100	158.56	21.8003
59.32	28.7383	94.56	27.3059	159.00	21.8187
59.54	25.2318	94.65	27.3130	162.33	21.2920
60.96	27.4084	94.67	27.3145	162.66	21.3053
61.17	25.3997	94.87	27.3303	163.33	24.9985
62.93	23.7878	97.43	27.5308	165.86	19.0887
63.29	23.8215	98.43	18.9808	176.31	26.6197
63.58	23.8486	98.44	18.9813	176.60	26.6336
64.28	23.9137	99.53	19.9044	177.52	26.6768
66.73	21.8028	100.11	23.4038	181.07	0.0000
67.24	27.0458	102.03	15.6849	181.52	33.0620
125.81	27.3510	103.18	15.7339	184.41	23.8812
67.75	27.3579	103.37	20.1148	143.76	23.9342
68.89	44.7430	105.21	18.4566	193.51	16.8672
69.67	28.3401	105.31	18.4614	197.03	18.3775
70.82	34.7822	106.12	22.9061	198.01	21.2384
70.83	34.7835	106.47	16.7546	201.83	29.9149
72.81	38.2148	109.28	32.8676	203.43	25.7062
72.87	38.2229	111.00	26.7673	205.31	30.0790
74.66	32.0523	111.76	0.0000	210.85	26.0032
74.82	32.0703	114.06	26.9749	215.65	25.1012
74.97	32.0868	116.30	0.0000	218.12	23.0027
77.11	32.3224	116.74	28.0597	222.11	18.7310
78.74	32.4997	119.76	29.1780	227.09	27.7451
79.69	31.5152	121.12	26.5288	227.38	23.3155
80.03	31.5500	121.22	25.6200	228.16	0.0000
80.12	31.5597	121.78	24.7380	228.18	14.4498
80.19	31.5671	122.06	23.8376	116.74	14.4498
80.57	34.3310	122.92	29.3982	235.69	19.4717
81.00	24.5567	123.07	29.4087	235.96	16.4821
81.07	24.5622	265.00	31.2916	238.63	20.3030
81.75	32.8220	125.81	20.3481	238.98	0.0000
82.47	36.1884	127.23	32.4778	240.99	20.3687
83.79	26.4297	127.91	29.7404	242.00	20.3969
84.00	26.4473	129.30	26.1047	244.70	20.4716

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	14.0474	563.25	7.1191
252.80	16.8612	345.93	11.0862	564.24	0.0000
254.15	0.0000	351.06	12.8577	569.33	8.1686
256.23	11.5479	351.93	12.8687	946.00	8.1696
260.90	0.0000	355.39	0.0000	569.70	8.1706
264.66	16.3426	356.01	14.4713	583.19	5.1516
264.80	16.3456	364.49	13.0280	584.27	3.0931
265.00	15.1816	366.42	0.0000	595.83	4.6740
269.46	24.6619	372.51	9.6272	427.87	10.9388
270.03	23.5040	375.05	7.8959	602.52	0.0000
271.23	17.2618	377.52	16.7077	604.72	12.5337
273.65	18.8877	356.01	11.4990	607.14	12.5522
276.40	18.9512	388.16	10.6565	609.32	10.4744
277.37	17.3925	388.63	13.3264	610.33	10.4810
277.60	15.8158	391.69	7.1273	614.28	12.6079
278.00	15.8236	264.66	19.7585	618.01	0.0000
279.20	22.1849	401.81	15.2835	620.36	3.1637
279.54	23.7793	402.40	16.1913	621.93	0.0000
279.70	23.7842	404.85	18.0290	630.19	0.0000
280.46	17.8542	410.95	11.7818	631.29	5.3078
283.69	20.3136	413.71	10.9016	633.25	8.5023
284.31	11.9577	414.70	6.3647	634.78	7.4463
285.41	17.9604	423.72	10.0791	635.95	9.5804
285.90	0.0000	427.09	11.9458	636.99	2.5564
287.50	9.6025	427.87	9.1949	657.50	4.3123
290.67	11.2445	433.94	9.2417	657.76	4.3130
293.27	0.0000	439.40	11.1404	657.90	0.0000
351.93	15.7450	440.45	13.9374	661.66	8.6452
295.96	15.7585	453.88	9.3931	664.57	0.0000
879.38	19.4536	463.37	12.7766	666.33	9.7522
299.98	19.4844	468.07	5.6993	666.50	9.7529
300.09	19.4868	473.00	0.0000	667.71	0.0000
300.13	19.4878	475.06	11.4604	677.62	4.3621
301.36	19.5151	476.78	10.5193	685.70	0.0000
302.85	18.3261	477.60	8.6122	692.65	0.0000
256.23	9.7922	482.18	11.5229	695.00	12.1123
304.85	9.7959	487.02	8.6739	696.49	4.4082
306.78	20.8614	492.35	0.0000	696.51	4.4082
308.46	15.9830	497.08	9.7101	697.00	4.4093
311.90	4.9365	505.52	7.3279	697.30	6.6152
316.51	11.1635	507.63	0.0000	697.49	6.6160
319.41	11.6131	511.00	11.7711	702.65	7.7403
320.08	12.4518	514.00	11.7964	706.68	7.7574
321.04	9.9717	514.00	11.7964	711.68	10.0009
323.87	13.3359	520.40	10.8630	720.70	10.0492
325.23	13.3551	520.69	0.0000	721.93	0.0000
328.76	13.4053	522.65	0.0000	722.78	6.7070
333.37	16.8376	527.90	0.0000	722.91	5.5896
333.97	11.3725	528.26	7.9443	723.31	3.3544
334.37	11.3772	529.59	8.9458	724.19	11.1865
338.28	18.6158	529.87	0.0000	727.33	11.2052
338.32	18.6162	531.02	3.9798	733.00	7.8673
311.90	18.6574	537.26	9.9927	735.93	6.7537
340.48	18.6574	546.56	0.0000	333.97	9.0120
340.55	18.6587	552.55	14.1367	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	7.9135	949.00	5.9676	1384.29	3.2580
747.24	9.0579	667.71	0.0000	1408.01	1.0936
748.06	4.5309	962.31	3.7505	1434.09	4.4077
752.31	6.8113	964.08	6.0051	1435.80	2.2050
753.82	3.4083	966.17	6.0104	1457.56	0.0000
756.73	9.1022	911.20	2.8206	1460.82	5.3297
756.80	9.1025	983.53	1.8915	1489.16	4.4768
884.68	13.7036	984.45	0.0000	1505.03	3.3724
765.81	12.5737	1274.44	8.5556	1584.12	2.7558
766.42	12.5773	1001.03	9.5245	1596.21	4.6077
766.84	11.4364	1002.74	5.7186	1620.50	0.9273
772.60	0.0000	1004.73	6.6768	1621.92	0.0000
776.52	9.1937	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.8879
778.90	11.5059	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	4.8312	1764.49	4.8047
788.74	10.4059	1038.76	0.0000	1063.66	2.8868
792.07	3.4744	631.29	3.8782	1771.35	1.9250
795.86	4.6410	1048.07	6.7906	1791.20	0.0000
810.06	6.1333	1049.04	6.7932	1808.65	1.9419
810.29	6.1342	1050.41	0.9709	1810.72	0.0000
344.28	7.0110	1063.66	3.9033	1836.06	1.9542
810.76	7.0120	1077.00	7.8457		
815.77	7.9074	1077.34	5.8850		
1048.07	6.1583	1085.87	6.8876		
832.01	7.9687	1093.63	7.8940		
834.85	7.9791	1099.45	4.9445		
835.71	8.8693	1112.07	5.9604		
836.80	0.0000	1112.84	9.2747		
846.75	0.0000	1115.54	4.7745		
846.77	5.7057	1120.29	1.5942		
856.80	10.7476	1120.55	1.5943		
860.56	7.1772	1221.41	4.7845		
871.09	7.2117	1129.67	4.9988		
873.19	5.4139	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	4.5241	1173.23	3.0454		
880.51	7.2422	1177.95	7.1175		
881.60	7.2458	1189.05	4.0828		
883.24	4.5319	1204.77	4.1045		
884.68	3.6278	1221.41	7.2230		
889.28	6.3617	1231.02	5.1758		
894.76	2.7330	1235.36	10.3662		
898.04	5.4739	1238.28	4.1504		
900.72	4.5670	1260.41	0.0000		
903.28	3.6577	1271.87	4.1960		
911.20	4.4043	1274.44	2.0997		
912.08	4.4061	1274.54	2.0997		
923.98	0.0000	1291.59	4.2224		
926.50	7.3892	1298.22	0.0000		
929.11	7.3972	1312.11	4.2498		
935.54	2.7816	1332.49	4.2766		
937.49	5.5677	1362.66	0.0000		
944.13	6.2036	1365.19	3.2395		
946.00	1.4900	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:55.83

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724004.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM40.CNF;443
Background date : 26-FEB-2023 09:14:53
Sample date : 20-JAN-2023 11:30:00 Acquisition date : 28-FEB-2023 05:08:05
Sample ID : G609724004 Sample quantity : 6.47400E+01 GRAM
Detector name : GAM40 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.52 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2379916 Detector SN# :
Matrix Spike ID : LCS ID :

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.07*	77	228	0.91	127.21	123	10	2.13E-02	38.9	
2	3	74.78	185	147	0.96	150.66	144	19	5.14E-02	12.6	1.64E+00
3	3	77.07	353	144	1.04	155.25	144	19	9.82E-02	7.7	
4	2	87.22	142	142	1.23	175.57	165	29	3.95E-02	16.1	2.22E+00
5	2	89.88*	93	134	1.24	180.89	165	29	2.58E-02	23.7	
6	2	92.81*	199	123	1.19	186.77	165	29	5.53E-02	12.4	
7	0	98.91	50	164	1.41	198.97	194	11	1.39E-02	51.5	
8	2	127.62	25	112	1.31	256.45	254	11	6.93E-03	66.8	1.23E+01
9	2	129.50	39	120	1.19	260.22	254	11	1.08E-02	49.9	
10	0	144.04*	13	147	1.36	289.32	285	8	3.55E-03	170.5	
11	0	154.81	21	123	1.17	310.89	307	7	5.95E-03	88.8	
12	0	185.89*	201	219	1.22	373.13	367	13	5.58E-02	16.9	
13	0	209.34	64	115	0.76	420.08	416	9	1.79E-02	32.4	
14	3	238.80*	589	78	1.16	479.04	472	19	1.64E-01	4.9	2.00E+00
15	3	242.10	263	76	1.62	485.65	472	19	7.30E-02	9.6	
16	0	250.32	43	106	3.47	502.11	495	13	1.20E-02	51.8	
17	0	270.14	65	91	1.06	541.78	537	10	1.82E-02	29.9	
18	0	295.23*	359	132	1.29	592.00	585	14	9.97E-02	8.6	
19	0	300.55	23	69	0.71	602.66	599	7	6.30E-03	65.5	
20	0	315.51	30	82	5.20	632.61	625	14	8.32E-03	67.3	
21	0	323.91	22	64	0.93	649.42	645	8	6.07E-03	67.5	
22	0	328.67	39	60	1.10	658.94	655	9	1.07E-02	39.8	
23	0	339.06	98	126	1.25	679.74	673	14	2.72E-02	26.3	
24	0	352.16*	656	132	1.32	705.95	698	16	1.82E-01	5.5	
25	0	410.08	27	49	1.56	821.88	816	9	7.39E-03	51.4	
26	0	430.35	51	58	2.58	862.45	857	16	1.43E-02	35.5	
27	0	442.87	29	36	4.35	887.52	881	13	8.06E-03	46.4	
28	0	463.49	41	40	1.21	928.79	923	10	1.14E-02	32.8	
29	0	511.48*	58	30	1.36	1024.82	1018	15	1.60E-02	29.6	
30	0	535.63	16	10	0.89	1073.14	1069	7	4.37E-03	42.3	
31	0	556.48	27	52	9.03	1114.87	1101	22	7.40E-03	73.3	
32	5	570.26*	21	38	2.39	1142.43	1137	14	5.93E-03	56.5	4.57E+00
33	5	573.22	8	18	1.14	1148.36	1137	14	2.22E-03	87.1	
34	0	583.55*	156	53	1.24	1169.04	1163	13	4.34E-02	12.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	609.60*	451	32	1.24	1221.16	1214	13	1.25E-01	5.3	
36	0	668.10*	10	33	3.11	1338.21	1328	12	2.91E-03	115.0	
37	1	675.34	15	15	1.71	1352.69	1347	24	4.21E-03	50.7	1.26E+00
38	1	679.15	14	8	1.71	1360.31	1347	24	3.91E-03	55.0	
39	0	722.49	7	31	0.81	1447.01	1440	11	2.07E-03	148.1	
40	0	727.60*	55	24	1.93	1457.24	1450	12	1.53E-02	22.7	
41	0	768.57*	34	25	1.85	1539.21	1534	11	9.45E-03	33.5	
42	0	787.76	19	19	1.24	1577.58	1571	11	5.17E-03	53.3	
43	0	791.83	5	10	0.46	1585.73	1581	7	1.46E-03	109.7	
44	0	796.19	48	14	5.37	1594.46	1587	18	1.33E-02	23.2	
45	0	807.24	15	23	1.36	1616.56	1609	13	4.04E-03	72.8	
46	0	810.82	9	9	1.27	1623.73	1621	7	2.43E-03	66.0	
47	0	815.39	26	9	3.94	1632.87	1627	12	7.30E-03	30.0	
48	0	848.34*	4	16	0.53	1698.77	1692	10	1.04E-03	253.7	
49	0	861.38*	19	18	1.23	1724.86	1720	9	5.34E-03	46.7	
50	0	885.46	11	9	1.33	1773.01	1769	9	2.97E-03	62.9	
51	4	911.56*	125	14	2.11	1825.21	1819	26	3.48E-02	11.0	9.37E-01
52	4	916.24	15	9	2.48	1834.58	1819	26	4.23E-03	69.9	
53	0	935.52	48	16	2.42	1873.13	1866	18	1.34E-02	25.0	
54	0	956.69	9	13	2.36	1915.48	1906	13	2.36E-03	93.6	
55	1	965.12	15	6	1.89	1932.34	1928	20	4.12E-03	47.4	9.67E-01
56	1	969.38	62	12	1.89	1940.86	1928	20	1.71E-02	17.2	
57	0	1024.35	18	6	3.88	2050.78	2045	12	5.00E-03	36.0	
58	0	1120.60*	91	13	1.14	2243.24	2237	13	2.52E-02	13.5	
59	0	1155.48	21	10	4.96	2312.98	2306	13	5.91E-03	37.2	
60	0	1212.75	22	18	2.91	2427.49	2420	22	6.04E-03	52.6	
61	0	1237.80*	32	11	0.77	2477.58	2471	14	8.82E-03	28.7	
62	0	1299.41	11	5	0.86	2600.73	2596	9	3.11E-03	45.7	
63	0	1332.18	6	5	0.95	2666.24	2659	9	1.72E-03	74.4	
64	0	1378.31	27	8	0.97	2758.45	2751	15	7.36E-03	29.7	
65	0	1401.70	11	2	0.56	2805.19	2801	8	3.09E-03	37.1	
66	0	1408.48	16	0	2.16	2818.75	2814	9	4.44E-03	25.0	
67	0	1461.32*	148	3	2.38	2924.35	2918	12	4.10E-02	8.8	
68	0	1510.68	6	11	0.67	3023.00	3015	11	1.67E-03	114.6	
69	0	1589.96	11	6	1.41	3181.43	3174	11	2.92E-03	53.1	
70	0	1730.56	18	6	1.06	3462.35	3455	13	4.94E-03	37.8	
71	0	1765.46*	59	3	2.19	3532.06	3525	14	1.65E-02	15.2	
72	0	1848.29	16	3	0.65	3697.54	3691	12	4.44E-03	33.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:08:57

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724004.CNF;1
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title : RXF2
Sample date : 20-JAN-2023 11:30:00 Acquisition date : 28-FEB-2023 05:08:05
Sample ID : G609724004 Sample quantity : 64.740 GRAM
Sample type : SOLID Sample geometry :
Detector name : GAMMA40 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.52 0.0%
Energy tolerance : 1.50 keV Half life ratio : 10.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	9.718E-01	1.508E+01	1.508E+01	17.59	OK
CO-58	810.76	99.45*	1.671E+00	5.400E-02	7.889E-02	131.92	OK
CD-109	88.03	3.70*	4.340E+00	7.993E+00	8.472E+00	32.20	OK
SN-126	64.28	9.60	1.753E+00	4.032E+00	4.032E+00	77.73	OK
	86.94	8.90	4.340E+00	3.323E+00	3.323E+00	32.20	OK
	87.57	37.00*	4.340E+00	7.993E-01	7.993E-01	32.20	OK
TL-208	277.37	6.60	3.918E+00	----- Line	Not Found	-----	Absent
	583.19	85.00*	2.232E+00	8.304E-01	8.304E-01	25.22	OK
	860.56	12.50	1.579E+00	1.003E+00	1.003E+00	93.44	OK
BI-211	72.87	1.23	2.915E+00	----- Line	Not Found	-----	Absent
	351.06	12.92*	3.295E+00	1.510E+01	1.510E+01	11.10	OK
BI-212	727.33	6.67*	1.845E+00	4.574E+00	4.574E+00	45.47	OK
	1620.50	1.47	9.040E-01	----- Line	Not Found	-----	Absent
PB-212	74.82	10.28	3.132E+00	5.134E+00	5.134E+00	25.29	OK
	77.11	17.10	3.383E+00	5.470E+00	5.470E+00	15.34	OK
	238.63	43.60*	4.351E+00	2.976E+00	2.976E+00	9.74	OK
	300.09	3.30	3.698E+00	1.804E+00	1.804E+00	130.96	OK
BI-214	609.32	45.49*	2.152E+00	4.649E+00	4.649E+00	10.64	OK
	1120.29	14.92	1.228E+00	5.166E+00	5.166E+00	26.96	OK
	1764.49	15.30	8.633E-01	4.809E+00	4.809E+00	30.37	OK
PB-214	74.82	5.80	3.132E+00	9.100E+00	9.100E+00	25.29	OK
	77.11	9.70	3.383E+00	9.643E+00	9.643E+00	15.34	OK
	87.09	3.41	4.340E+00	8.673E+00	8.673E+00	32.20	OK
	242.00	7.25	4.310E+00	8.061E+00	8.061E+00	19.14	OK
	295.22	18.42	3.746E+00	5.045E+00	5.045E+00	17.29	OK
	351.93	35.60*	3.295E+00	5.480E+00	5.481E+00	11.10	OK
RN-222	609.32	45.49*	2.152E+00	4.649E+00	4.649E+00	10.64	OK
	1120.29	14.92	1.228E+00	5.166E+00	5.166E+00	26.96	OK
	1764.49	15.30	8.633E-01	4.809E+00	4.809E+00	30.37	OK
RA-224	240.99	4.10*	4.310E+00	1.425E+01	1.425E+01	19.14	OK
RA-226	74.82	5.80	3.132E+00	9.100E+00	9.100E+00	25.29	OK
	77.11	9.70	3.383E+00	9.643E+00	9.643E+00	15.34	OK
	87.09	3.41	4.340E+00	8.673E+00	8.673E+00	32.20	OK
	242.00	7.25	4.310E+00	8.061E+00	8.061E+00	19.14	OK
	295.22	18.42	3.746E+00	5.045E+00	5.045E+00	17.29	OK
	351.93	35.60*	3.295E+00	5.480E+00	5.481E+00	11.10	OK
AC-228	105.21	1.10	5.356E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.388E+00	2.509E+00	2.509E+00	52.63	OK
	835.71	1.61	1.625E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07	OK
	968.97	15.80	1.411E+00	2.858E+00	2.858E+00	34.44	OK
RA-228	105.21	1.10	5.356E+00	----- Line	Not Found	-----	Absent
	338.32	11.27	3.388E+00	2.509E+00	2.509E+00	52.63	OK
	835.71	1.61	1.625E+00	----- Line	Not Found	-----	Absent
	911.20	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07	OK
	968.97	15.80	1.411E+00	2.858E+00	2.858E+00	34.44	OK
TH-228	74.82	10.28	3.132E+00	5.134E+00	5.134E+00	25.29	OK
	77.11	17.10	3.383E+00	5.470E+00	5.470E+00	15.34	OK
	238.63	43.60*	4.351E+00	2.976E+00	2.976E+00	9.74	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	300.09	3.30	3.698E+00	1.804E+00	1.804E+00	130.96	OK
TH-230	74.82	5.80	3.132E+00	9.100E+00	9.100E+00	25.29	OK
	77.11	9.70	3.383E+00	9.643E+00	9.643E+00	15.34	OK
	87.09	3.41	4.340E+00	8.673E+00	8.673E+00	32.20	OK
	242.00	7.25	4.310E+00	8.061E+00	8.061E+00	19.14	OK
	295.22	18.42	3.746E+00	5.045E+00	5.045E+00	17.29	OK
	351.93	35.60*	3.295E+00	5.480E+00	5.480E+00	11.10	OK
PA-231	283.69	1.70	3.855E+00	----- Line Not Found	-----		Absent
	301.36	5.35*	3.698E+00	1.113E+00	1.113E+00	130.96	OK
TH-232	105.21	1.10	5.356E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.388E+00	2.509E+00	2.509E+00	52.63	OK
	835.71	1.61	1.625E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07	OK
	968.97	15.80	1.411E+00	2.858E+00	2.858E+00	34.44	OK
TH-234	63.29	3.70*	1.753E+00	1.046E+01	1.046E+01	77.73	OK
	92.59	4.23	4.746E+00	8.975E+00	8.975E+00	24.77	OK
U-234	74.82	5.80	3.132E+00	9.100E+00	9.100E+00	25.29	OK
	77.11	9.70	3.383E+00	9.643E+00	9.643E+00	15.34	OK
	87.09	3.41	4.340E+00	8.673E+00	8.673E+00	32.20	OK
	242.00	7.25	4.310E+00	8.061E+00	8.061E+00	19.14	OK
	295.22	18.42	3.746E+00	5.045E+00	5.045E+00	17.29	OK
	351.93	35.60*	3.295E+00	5.480E+00	5.480E+00	11.10	OK
U-235	89.96	3.47	4.544E+00	5.331E+00	5.331E+00	47.48	OK
	93.35	5.60	4.746E+00	6.779E+00	6.779E+00	24.77	OK
	143.76	10.96*	5.658E+00	1.918E-01	1.918E-01	341.03	OK
	163.33	5.08	5.430E+00	----- Line Not Found	-----		Absent
	185.72	57.20	5.096E+00	6.507E-01	6.507E-01	33.84	OK
	205.31	5.01	4.805E+00	----- Line Not Found	-----		Absent
U-238	63.29	3.70*	1.753E+00	1.046E+01	1.046E+01	77.73	OK
	92.59	4.23	4.746E+00	8.975E+00	8.975E+00	24.77	OK
AM-243	43.53	5.90	1.547E-01	----- Line Not Found	-----		Absent
	74.66	67.20*	3.132E+00	7.854E-01	7.854E-01	25.29	OK
ANH-511	511.00	100.00*	2.483E+00	2.327E-01	2.327E-01	59.24	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:58.16

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724004.CNF;1    *
* Acquisition date : 28-FEB-2023 05:08:05 Sensitivity     : 3.000           *
* Detector ID      : GAM40                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.52     Half life ratio : *****           *
* Sample date      : 20-JAN-2023 11:30:00 Analyst initials: RXF2            *
* Sample ID        : G609724004           Sample Quantity : 6.4740E+01 GRAM *
* Batch Number     : 2379916              Wet Weight      :    0.00000      *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000      *
* Nuclide Library  : SOLID.NLB;17                                           *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 25-OCT-2022 08:28:28 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM40_CAN.CNF;12            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.508E+01	2.599E+00	1.629E+00
CO-58	7.889E-02	1.020E-01	2.624E-01
CD-109	8.472E+00	2.674E+00	3.266E+00
SN-126	7.993E-01	2.522E-01	3.106E-01
TL-208	8.304E-01	2.053E-01	1.504E-01
BI-211	1.510E+01	1.642E+00	8.344E-01
BI-212	4.574E+00	2.038E+00	2.023E+00
PB-212	2.976E+00	2.842E-01	2.271E-01
BI-214	4.649E+00	4.850E-01	2.581E-01
PB-214	5.481E+00	5.960E-01	3.035E-01
RN-222	4.649E+00	4.850E-01	2.581E-01
RA-224	1.425E+01	2.674E+00	2.434E+00
RA-226	5.481E+00	5.960E-01	3.035E-01
AC-228	3.346E+00	7.237E-01	5.354E-01
RA-228	3.346E+00	7.237E-01	5.354E-01
TH-228	2.976E+00	2.842E-01	2.271E-01
TH-230	5.480E+00	5.960E-01	3.034E-01
PA-231	1.113E+00	1.428E+00	1.950E+00
TH-232	3.346E+00	7.237E-01	5.354E-01
TH-234	1.046E+01	7.968E+00	8.043E+00
U-234	5.480E+00	5.960E-01	3.034E-01
U-235	1.918E-01	6.409E-01	8.068E-01
U-238	1.046E+01	7.968E+00	8.043E+00
AM-243	7.854E-01	1.947E-01	2.618E-01
ANH-511	2.327E-01	1.351E-01	1.191E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-3.524E-01	9.951E-01	1.738E+00	NOT IDENT.
NA-22	-5.242E-02	1.014E-01	1.803E-01	NOT IDENT.
NA-24	0.000E+00	2.577E+17	0.000E+00	SHORT HLIF
AL-26	2.543E-02	7.665E-02	1.753E-01	NOT IDENT.
SC-46	2.881E-02	1.196E-01	2.073E-01	FAIL ABUN

V-48	-6.897E-03	4.575E-01	8.370E-01	NOT IDENT.
CR-51	1.318E+00	1.855E+00	2.796E+00	NOT IDENT.
MN-52	1.024E+01	1.082E+01	2.553E+01	FAIL ABUN
MN-54	1.068E-02	9.427E-02	1.735E-01	NOT IDENT.
CO-56	7.742E-02	1.194E-01	2.381E-01	FAIL ABUN
MN-56	0.000E+00	1.535E+41	0.000E+00	SHORT HLIF
CO-57	1.406E-02	6.404E-02	1.081E-01	NOT IDENT.
FE-59	1.306E-01	2.818E-01	5.924E-01	NOT IDENT.
CO-60	6.299E-02	9.179E-02	1.992E-01	FAIL ABUN
ZN-65	2.724E-01	1.824E-01	4.316E-01	NOT IDENT.
GE-68	-1.587E+00	2.957E+00	5.301E+00	NOT IDENT.
AS-73	2.861E+00	5.120E+00	8.959E+00	NOT IDENT.
AS-74	-1.190E-01	5.355E-01	9.397E-01	NOT IDENT.
SE-75	5.438E-02	1.262E-01	2.160E-01	NOT IDENT.
BR-77	0.000E+00	4.348E+04	0.000E+00	SHORT HLIF
SR-82	-1.000E+00	1.472E+00	2.383E+00	NOT IDENT.
RB-83	3.459E-02	1.662E-01	3.178E-01	NOT IDENT.
RB-84	1.803E-02	3.180E-01	5.284E-01	NOT IDENT.
KR-85	2.078E+01	1.722E+01	3.291E+01	NOT IDENT.
SR-85	1.408E-01	1.169E-01	2.235E-01	NOT IDENT.
RB-86	-2.262E+00	4.216E+00	7.558E+00	NOT IDENT.
Y-88	-1.722E-03	7.107E-02	1.616E-01	NOT IDENT.
Y-91	-2.655E+01	5.197E+01	9.348E+01	NOT IDENT.
NB-94	3.692E-02	7.802E-02	1.505E-01	NOT IDENT.
NB-95	-1.013E-01	1.592E-01	2.232E-01	NOT IDENT.
NB-95M	-1.054E-01	4.597E-01	6.683E-01	NOT IDENT.
ZR-95	9.567E-02	2.512E-01	4.723E-01	NOT IDENT.
NB-97	0.000E+00	1.371E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.542E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.060E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	6.055E-02	7.925E-02	1.277E-01	FAIL ABUN
RH-102	4.795E-02	1.342E-01	2.546E-01	NOT IDENT.
RU-103	2.894E-02	1.451E-01	2.693E-01	FAIL ABUN
RH-106	7.804E-01	7.696E-01	1.578E+00	NOT IDENT.
RU-106	7.804E-01	7.696E-01	1.578E+00	NOT IDENT.
AG-108M	-2.609E-02	6.602E-02	1.151E-01	FAIL ABUN
AG-110	7.942E-01	1.832E+00	3.520E+00	NOT IDENT.
AG-110M	1.098E-01	1.354E-01	2.632E-01	FAIL ABUN
SN-113	7.641E-03	1.243E-01	2.260E-01	NOT IDENT.
CD-115	0.000E+00	3.993E+04	0.000E+00	SHORT HLIF
SN-117M	3.209E-03	4.978E-01	8.135E-01	FAIL ABUN
SB-122	0.000E+00	2.029E+03	0.000E+00	SHORT HLIF
TE-123M	1.701E-02	8.448E-02	1.405E-01	NOT IDENT.
SB-124	-1.655E-01	3.013E-01	5.257E-01	FAIL ABUN
SB-125	1.276E-01	2.434E-01	4.243E-01	FAIL ABUN
TE-125M	-3.134E+00	3.289E+01	5.409E+01	NOT IDENT.
I-126	1.486E+00	1.982E+00	3.918E+00	NOT IDENT.
SB-126	8.839E-01	1.519E+00	2.687E+00	NOT IDENT.
SB-127	0.000E+00	1.931E+02	0.000E+00	SHORT HLIF
I-131	-2.511E-01	1.963E+00	3.534E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	2.940E+02	0.000E+00	SHORT HLIF
BA-133	2.220E-02	1.090E-01	1.821E-01	NOT IDENT.
I-133	0.000E+00	2.130E+12	0.000E+00	SHORT HLIF
CS-134	0.000E+00	1.587E-01	2.433E-01	FAIL ABUN
I-135	0.000E+00	1.534E+41	0.000E+00	SHORT HLIF
CS-136	5.176E-02	8.700E-01	1.708E+00	FAIL ABUN
BA-137M	-1.938E-02	9.121E-02	1.423E-01	NOT IDENT.
CS-137	-2.047E-02	9.636E-02	1.503E-01	NOT IDENT.
LA-138	3.531E-02	1.290E-01	2.761E-01	FAIL ABUN
CE-139	-8.833E-02	8.556E-02	1.283E-01	NOT IDENT.
BA-140	-1.116E+00	2.291E+00	3.427E+00	NOT IDENT.
LA-140	-3.304E-01	7.750E-01	1.409E+00	FAIL ABUN
CE-141	9.945E-02	3.324E-01	4.131E-01	FAIL ABUN
CE-143	0.000E+00	4.701E+07	0.000E+00	SHORT HLIF
CE-144	2.653E-01	5.402E-01	8.631E-01	NOT IDENT.
PM-144	-7.136E-02	8.153E-02	1.283E-01	NOT IDENT.
PR-144	-5.387E+00	6.180E+00	9.732E+00	NOT IDENT.
PM-146	3.538E-02	1.005E-01	1.891E-01	NOT IDENT.
ND-147	5.419E-01	6.177E+00	1.028E+01	FAIL ABUN
PM-147	1.138E+02	1.717E+03	2.874E+03	NOT IDENT.
PM-149	0.000E+00	3.502E+05	0.000E+00	SHORT HLIF
EU-150	-5.455E-02	7.500E-02	1.114E-01	FAIL ABUN
EU-152	-1.817E-01	2.346E-01	3.441E-01	FAIL ABUN
GD-153	3.457E-01	3.486E-01	3.653E-01	FAIL ABUN
EU-154	-1.406E-01	2.850E-01	5.093E-01	FAIL ABUN
EU-155	4.265E-02	2.574E-01	4.336E-01	FAIL ABUN

TB-160	1.835E-01	3.611E-01	7.355E-01	FAIL ABUN
HO-166M	-2.294E-03	1.266E-01	2.326E-01	FAIL ABUN
TM-171	1.110E+01	9.338E+01	1.588E+02	NOT IDENT.
HF-172	-4.742E-02	5.056E-01	7.658E-01	FAIL ABUN
LU-172	7.358E-02	1.495E-01	3.128E-01	FAIL ABUN
LU-176	4.666E-02	6.262E-02	1.200E-01	FAIL ABUN
HF-181	1.517E-01	1.572E-01	3.133E-01	NOT IDENT.
TA-182	-3.560E-01	4.385E-01	5.829E-01	FAIL ABUN
RE-183	-1.922E-02	1.084E+00	1.816E+00	NOT IDENT.
RE-184	1.712E-01	4.454E-01	8.738E-01	FAIL ABUN
W-188	-2.226E+01	2.325E+01	3.376E+01	FAIL ABUN
IR-192	1.420E-01	1.873E-01	1.677E-01	FAIL ABUN
HG-203	5.871E-02	1.252E-01	2.343E-01	NOT IDENT.
TL-204	-9.316E-01	1.647E+01	2.530E+01	NOT IDENT.
BI-207	-8.786E-02	1.186E-01	2.064E-01	FAIL ABUN
BI-210	-6.838E+00	2.590E+01	4.113E+01	NOT IDENT.
PB-210	-6.838E+00	2.590E+01	4.113E+01	NOT IDENT.
PB-211	6.592E-01	1.993E+00	3.354E+00	NOT IDENT.
BI-213	4.038E-02	2.552E-01	4.285E-01	NOT IDENT.
RN-219	-7.089E-01	1.008E+00	1.693E+00	FAIL ABUN
RA-223	1.525E+00	2.019E+00	3.239E+00	FAIL ABUN
AC-225	3.932E-01	7.353E+00	1.211E+01	NOT IDENT.
AC-227	2.577E-01	6.445E-01	1.094E+00	FAIL ABUN
TH-227	2.577E-01	6.445E-01	1.094E+00	FAIL ABUN
TH-229	2.005E-01	1.342E+00	2.219E+00	FAIL ABUN
TH-231	1.525E+00	2.019E+00	3.239E+00	FAIL ABUN
PA-233	7.543E-02	1.593E-01	2.754E-01	FAIL ABUN
PA-234	-8.814E-02	6.929E-01	1.241E+00	FAIL ABUN
PA-234M	4.093E+00	9.699E+00	1.936E+01	NOT IDENT.
NP-237	7.543E-02	1.593E-01	2.754E-01	FAIL ABUN
NP-238	0.000E+00	1.126E+05	0.000E+00	SHORT HLIF
NP-239	-8.143E-02	6.560E-01	1.077E+00	FAIL ABUN
PU-239	9.923E+02	9.702E+02	1.515E+03	FAIL ABUN
AM-241	-1.343E-01	6.749E-01	1.030E+00	NOT IDENT.
CM-243	-5.433E-02	2.782E-01	4.202E-01	FAIL ABUN
BK-247	2.535E-02	1.976E-01	3.282E-01	NOT IDENT.
CM-247	-5.081E-02	9.308E-02	1.590E-01	NOT IDENT.
CF-249	1.729E-02	1.038E-01	1.892E-01	NOT IDENT.
CF-251	1.624E-01	3.309E-01	5.624E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:08:56.64

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	135	10.66*	9.718E-01	1.508E+01	1.508E+01	17.59
CO-58	810.76	8	99.45*	1.671E+00	5.400E-02	7.889E-02	131.92
CD-109	88.03	111	3.70*	4.340E+00	7.993E+00	8.472E+00	32.20
SN-126	64.28	58	9.60	1.753E+00	4.032E+00	4.032E+00	77.73
	86.94	111	8.90	4.340E+00	3.323E+00	3.323E+00	32.20
	87.57	111	37.00*	4.340E+00	7.993E-01	7.993E-01	32.20
CE-141	145.44	10	48.29*	5.658E+00	4.353E-02	9.945E-02	341.03
TL-208	277.37	------	6.60	3.918E+00	------ Line Not Found		------
	583.19	136	85.00*	2.232E+00	8.304E-01	8.304E-01	25.22
	860.56	17	12.50	1.579E+00	1.003E+00	1.003E+00	93.44
BI-211	72.87	------	1.23	2.915E+00	------ Line Not Found		------
	351.06	554	12.92*	3.295E+00	1.510E+01	1.510E+01	11.10
BI-212	727.33	49	6.67*	1.845E+00	4.574E+00	4.574E+00	45.47
	1620.50	------	1.47	9.040E-01	------ Line Not Found		------
PB-212	74.82	143	10.28	3.132E+00	5.134E+00	5.134E+00	25.29
	77.11	273	17.10	3.383E+00	5.470E+00	5.470E+00	15.34
	238.63	487	43.60*	4.351E+00	2.976E+00	2.976E+00	9.74
	300.09	19	3.30	3.698E+00	1.804E+00	1.804E+00	130.96
BI-214	609.32	392	45.49*	2.152E+00	4.649E+00	4.649E+00	10.64
	1120.29	82	14.92	1.228E+00	5.166E+00	5.166E+00	26.96
	1764.49	55	15.30	8.633E-01	4.809E+00	4.809E+00	30.37
PB-214	74.82	143	5.80	3.132E+00	9.100E+00	9.100E+00	25.29
	77.11	273	9.70	3.383E+00	9.643E+00	9.643E+00	15.34
	87.09	111	3.41	4.340E+00	8.673E+00	8.673E+00	32.20
	242.00	217	7.25	4.310E+00	8.061E+00	8.061E+00	19.14
	295.22	300	18.42	3.746E+00	5.045E+00	5.045E+00	17.29
	351.93	554	35.60*	3.295E+00	5.480E+00	5.481E+00	11.10
RN-222	609.32	392	45.49*	2.152E+00	4.649E+00	4.649E+00	10.64
	1120.29	82	14.92	1.228E+00	5.166E+00	5.166E+00	26.96
	1764.49	55	15.30	8.633E-01	4.809E+00	4.809E+00	30.37
RA-224	240.99	217	4.10*	4.310E+00	1.425E+01	1.425E+01	19.14
RA-226	74.82	143	5.80	3.132E+00	9.100E+00	9.100E+00	25.29
	77.11	273	9.70	3.383E+00	9.643E+00	9.643E+00	15.34
	87.09	111	3.41	4.340E+00	8.673E+00	8.673E+00	32.20
	242.00	217	7.25	4.310E+00	8.061E+00	8.061E+00	19.14
	295.22	300	18.42	3.746E+00	5.045E+00	5.045E+00	17.29
	351.93	554	35.60*	3.295E+00	5.480E+00	5.481E+00	11.10
AC-228	105.21	------	1.10	5.356E+00	------ Line Not Found		------
	338.32	83	11.27	3.388E+00	2.509E+00	2.509E+00	52.63
	835.71	------	1.61	1.625E+00	------ Line Not Found		------
	911.20	111	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07
	968.97	55	15.80	1.411E+00	2.858E+00	2.858E+00	34.44
RA-228	105.21	------	1.10	5.356E+00	------ Line Not Found		------
	338.32	83	11.27	3.388E+00	2.509E+00	2.509E+00	52.63
	835.71	------	1.61	1.625E+00	------ Line Not Found		------
	911.20	111	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07
	968.97	55	15.80	1.411E+00	2.858E+00	2.858E+00	34.44

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	143	10.28	3.132E+00	5.134E+00	5.134E+00	25.29
	77.11	273	17.10	3.383E+00	5.470E+00	5.470E+00	15.34
	238.63	487	43.60*	4.351E+00	2.976E+00	2.976E+00	9.74
	300.09	19	3.30	3.698E+00	1.804E+00	1.804E+00	130.96
TH-230	74.82	143	5.80	3.132E+00	9.100E+00	9.100E+00	25.29
	77.11	273	9.70	3.383E+00	9.643E+00	9.643E+00	15.34
	87.09	111	3.41	4.340E+00	8.673E+00	8.673E+00	32.20
	242.00	217	7.25	4.310E+00	8.061E+00	8.061E+00	19.14
	295.22	300	18.42	3.746E+00	5.045E+00	5.045E+00	17.29
	351.93	554	35.60*	3.295E+00	5.480E+00	5.480E+00	11.10
PA-231	283.69	------	1.70	3.855E+00	------ Line Not Found		------
	301.36	19	5.35*	3.698E+00	1.113E+00	1.113E+00	130.96
TH-232	105.21	------	1.10	5.356E+00	------ Line Not Found		------
	338.32	83	11.27	3.388E+00	2.509E+00	2.509E+00	52.63
	835.71	------	1.61	1.625E+00	------ Line Not Found		------
	911.20	111	25.80*	1.497E+00	3.346E+00	3.346E+00	22.07
	968.97	55	15.80	1.411E+00	2.858E+00	2.858E+00	34.44
TH-234	63.29	58	3.70*	1.753E+00	1.046E+01	1.046E+01	77.73
	92.59	155	4.23	4.746E+00	8.975E+00	8.975E+00	24.77
U-234	74.82	143	5.80	3.132E+00	9.100E+00	9.100E+00	25.29
	77.11	273	9.70	3.383E+00	9.643E+00	9.643E+00	15.34
	87.09	111	3.41	4.340E+00	8.673E+00	8.673E+00	32.20
	242.00	217	7.25	4.310E+00	8.061E+00	8.061E+00	19.14
	295.22	300	18.42	3.746E+00	5.045E+00	5.045E+00	17.29
	351.93	554	35.60*	3.295E+00	5.480E+00	5.480E+00	11.10
U-235	89.96	72	3.47	4.544E+00	5.331E+00	5.331E+00	47.48
	93.35	155	5.60	4.746E+00	6.779E+00	6.779E+00	24.77
	143.76	10	10.96*	5.658E+00	1.918E-01	1.918E-01	341.03
	163.33	------	5.08	5.430E+00	------ Line Not Found		------
	185.72	164	57.20	5.096E+00	6.507E-01	6.507E-01	33.84
	205.31	------	5.01	4.805E+00	------ Line Not Found		------
U-238	63.29	58	3.70*	1.753E+00	1.046E+01	1.046E+01	77.73
	92.59	155	4.23	4.746E+00	8.975E+00	8.975E+00	24.77
AM-243	43.53	------	5.90	1.547E-01	------ Line Not Found		------
	74.66	143	67.20*	3.132E+00	7.854E-01	7.854E-01	25.29
ANH-511	511.00	50	100.00*	2.483E+00	2.327E-01	2.327E-01	59.24

Flag: "*" = Keyline

Sample ID : G609724004 Acquisition date : 28-FEB-2023 05:08:05

Total number of lines in spectrum 72
Number of unidentified lines 23
Number of lines tentatively identified by NID 49 68.06%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.508E+01	1.508E+01	0.265E+01	17.59	
CO-58	70.86D	1.46	5.400E-02	7.889E-02	10.41E-02	131.92	
CD-109	461.40D	1.06	7.993E+00	8.472E+00	2.728E+00	32.20	
SN-126	2.30E+05Y	1.00	7.993E-01	7.993E-01	2.574E-01	32.20	
CE-141	32.51D	2.28	4.353E-02	9.945E-02	33.92E-02	341.03	
TL-208	1.41E+10Y	1.00	8.304E-01	8.304E-01	2.094E-01	25.22	
BI-211	7.04E+08Y	1.00	1.510E+01	1.510E+01	0.168E+01	11.10	
BI-212	1.41E+10Y	1.00	4.574E+00	4.574E+00	2.080E+00	45.47	
PB-212	1.41E+10Y	1.00	2.976E+00	2.976E+00	0.290E+00	9.74	
BI-214	1600.00Y	1.00	4.649E+00	4.649E+00	0.495E+00	10.64	
PB-214	1600.00Y	1.00	5.480E+00	5.481E+00	0.608E+00	11.10	
RN-222	1600.00Y	1.00	4.649E+00	4.649E+00	0.495E+00	10.64	
RA-224	1.41E+10Y	1.00	1.425E+01	1.425E+01	0.273E+01	19.14	
RA-226	1600.00Y	1.00	5.480E+00	5.481E+00	0.608E+00	11.10	
AC-228	1.41E+10Y	1.00	3.346E+00	3.346E+00	0.738E+00	22.07	
RA-228	1.41E+10Y	1.00	3.346E+00	3.346E+00	0.738E+00	22.07	
TH-228	1.41E+10Y	1.00	2.976E+00	2.976E+00	0.290E+00	9.74	
TH-230	7.54E+04Y	1.00	5.480E+00	5.480E+00	0.608E+00	11.10	
PA-231	7.04E+08Y	1.00	1.113E+00	1.113E+00	1.457E+00	130.96	
TH-232	1.41E+10Y	1.00	3.346E+00	3.346E+00	0.738E+00	22.07	
TH-234	4.47E+09Y	1.00	1.046E+01	1.046E+01	0.813E+01	77.73	
U-234	2.45E+05Y	1.00	5.480E+00	5.480E+00	0.608E+00	11.10	
U-235	7.04E+08Y	1.00	1.918E-01	1.918E-01	6.540E-01	341.03	
U-238	4.47E+09Y	1.00	1.046E+01	1.046E+01	0.813E+01	77.73	
AM-243	7370.00Y	1.00	7.854E-01	7.854E-01	1.986E-01	25.29	
ANH-511	1.00E+09Y	1.00	2.327E-01	2.327E-01	1.378E-01	59.24	
			---------	---------			
	Total Activity :		1.292E+02	1.297E+02			

Grand Total Activity : 1.292E+02 1.297E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	98.91	39	128	1.41	198.97	194	11	1.39E-02	****	5.09E+00	T
2	127.62	20	89	1.31	256.45	254	11	6.93E-03	****	5.72E+00	T
2	129.50	31	96	1.19	260.22	254	11	1.08E-02	99.8	5.72E+00	T
0	154.81	17	99	1.17	310.89	307	7	5.95E-03	****	5.54E+00	T
0	209.34	53	94	0.76	420.08	416	9	1.79E-02	64.8	4.75E+00	
0	250.32	36	88	3.47	502.11	495	13	1.20E-02	****	4.21E+00	
0	270.14	54	75	1.06	541.78	537	10	1.82E-02	59.7	3.99E+00	T
0	315.51	25	69	5.20	632.61	625	14	8.32E-03	****	3.57E+00	T
0	323.91	18	54	0.93	649.42	645	8	6.07E-03	****	3.50E+00	T
0	328.67	32	51	1.10	658.94	655	9	1.07E-02	79.7	3.47E+00	T
0	410.08	23	42	1.56	821.88	816	9	7.39E-03	****	2.94E+00	T
0	430.35	44	49	2.58	862.45	857	16	1.43E-02	71.1	2.84E+00	
0	442.87	25	31	4.35	887.52	881	13	8.06E-03	92.8	2.78E+00	
0	463.49	35	34	1.21	928.79	923	10	1.14E-02	65.7	2.68E+00	T
0	535.63	14	9	0.89	1073.14	1069	7	4.37E-03	84.7	2.39E+00	
0	556.48	23	45	9.03	1114.87	1101	22	7.40E-03	****	2.32E+00	
5	570.26	19	33	2.39	1142.43	1137	14	5.93E-03	****	2.27E+00	T
5	573.22	7	15	1.14	1148.36	1137	14	2.22E-03	****	2.26E+00	
0	668.10	9	28	3.11	1338.21	1328	12	2.91E-03	****	1.99E+00	T
1	675.34	13	13	1.71	1352.69	1347	24	4.21E-03	****	1.97E+00	
1	679.15	12	7	1.71	1360.31	1347	24	3.91E-03	****	1.96E+00	
0	722.49	7	27	0.81	1447.01	1440	11	2.07E-03	****	1.86E+00	T
0	768.57	30	22	1.85	1539.21	1534	11	9.45E-03	66.9	1.76E+00	
0	787.76	16	17	1.24	1577.58	1571	11	5.17E-03	****	1.72E+00	T
0	791.83	5	9	0.46	1585.73	1581	7	1.46E-03	****	1.71E+00	T
0	796.19	42	13	5.37	1594.46	1587	18	1.33E-02	46.3	1.70E+00	T
0	807.24	13	21	1.36	1616.56	1609	13	4.04E-03	****	1.68E+00	
0	815.39	23	8	3.94	1632.87	1627	12	7.30E-03	59.9	1.66E+00	T
0	848.34	3	15	0.53	1698.77	1692	10	1.04E-03	****	1.60E+00	
0	885.46	10	8	1.33	1773.01	1769	9	2.97E-03	****	1.54E+00	T
4	916.24	14	8	2.48	1834.58	1819	26	4.23E-03	****	1.49E+00	
0	935.52	43	14	2.42	1873.13	1866	18	1.34E-02	50.0	1.46E+00	T
0	956.69	8	11	2.36	1915.48	1906	13	2.36E-03	****	1.43E+00	
1	965.12	13	5	1.89	1932.34	1928	20	4.12E-03	94.7	1.42E+00	T
0	1024.35	16	5	3.88	2050.78	2045	12	5.00E-03	72.0	1.34E+00	
0	1155.48	19	9	4.96	2312.98	2306	13	5.91E-03	74.4	1.19E+00	
0	1212.75	20	17	2.91	2427.49	2420	22	6.04E-03	****	1.14E+00	
0	1237.80	29	10	0.77	2477.58	2471	14	8.82E-03	57.3	1.12E+00	T
0	1299.41	10	4	0.86	2600.73	2596	9	3.11E-03	91.4	1.07E+00	T
0	1332.18	6	4	0.95	2666.24	2659	9	1.72E-03	****	1.05E+00	T
0	1378.31	24	7	0.97	2758.45	2751	15	7.36E-03	59.5	1.02E+00	
0	1401.70	10	2	0.56	2805.19	2801	8	3.09E-03	74.2	1.00E+00	
0	1408.48	15	0	2.16	2818.75	2814	9	4.44E-03	50.0	1.00E+00	T
0	1510.68	5	10	0.67	3023.00	3015	11	1.67E-03	****	9.48E-01	
0	1589.96	10	5	1.41	3181.43	3174	11	2.92E-03	****	9.15E-01	
0	1730.56	16	6	1.06	3462.35	3455	13	4.94E-03	75.5	8.71E-01	
0	1848.29	15	3	0.65	3697.54	3691	12	4.44E-03	66.1	8.48E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:08.14

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724004.CNF;1		
Acquisition date	: 28-FEB-2023 05:08:05	Sensitivity	: 3.000
Detector ID	: GAM40	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.52	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Nuclide Library	: SOLID
Sample ID	: G609724004	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 6.4740E+01 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 25-OCT-2022 08:28:28	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM40_CAN.CNF;12		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	6.665E-01
CO-58	1.179E-01
CD-109	1.538E+00
SN-126	1.463E-01
TL-208	6.725E-02
BI-211	3.821E-01
BI-212	8.882E-01
PB-212	1.057E-01
BI-214	1.136E-01
PB-214	1.390E-01
RN-222	1.136E-01
RA-224	1.133E+00
RA-226	1.390E-01
AC-228	2.282E-01
RA-228	2.282E-01
TH-228	1.057E-01
TH-230	1.390E-01
PA-231	8.992E-01
TH-232	2.282E-01
TH-234	3.801E+00
U-234	1.390E-01
U-235	3.796E-01
U-238	3.801E+00
AM-243	1.240E-01
ANH-511	5.346E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	7.777E-01	NOT IDENT.
NA-22	7.568E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	6.957E-02	NOT IDENT.
SC-46	8.995E-02	FAIL ABUN
V-48	3.595E-01	NOT IDENT.

CR-51	1.285E+00	NOT IDENT.
MN-52	1.086E+01	FAIL ABUN
MN-54	7.655E-02	NOT IDENT.
CO-56	1.056E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	5.072E-02	NOT IDENT.
FE-59	2.566E-01	NOT IDENT.
CO-60	8.476E-02	FAIL ABUN
ZN-65	1.885E-01	NOT IDENT.
GE-68	2.239E+00	NOT IDENT.
AS-73	4.216E+00	NOT IDENT.
AS-74	4.169E-01	NOT IDENT.
SE-75	1.002E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.024E+00	NOT IDENT.
RB-83	1.402E-01	NOT IDENT.
RB-84	2.318E-01	NOT IDENT.
KR-85	1.504E+01	NOT IDENT.
SR-85	1.021E-01	NOT IDENT.
RB-86	3.193E+00	NOT IDENT.
Y-88	5.726E-02	NOT IDENT.
Y-91	3.862E+01	NOT IDENT.
NB-94	6.726E-02	NOT IDENT.
NB-95	9.844E-02	NOT IDENT.
NB-95M	3.134E-01	NOT IDENT.
ZR-95	2.123E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	6.000E-02	FAIL ABUN
RH-102	1.141E-01	NOT IDENT.
RU-103	1.217E-01	FAIL ABUN
RH-106	7.115E-01	NOT IDENT.
RU-106	7.115E-01	NOT IDENT.
AG-108M	5.165E-02	FAIL ABUN
AG-110	1.574E+00	NOT IDENT.
AG-110M	1.165E-01	FAIL ABUN
SN-113	1.034E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	3.844E-01	FAIL ABUN
SB-122	0.000E+00	SHORT HLIF
TE-123M	6.624E-02	NOT IDENT.
SB-124	2.055E-01	FAIL ABUN
SB-125	1.940E-01	FAIL ABUN
TE-125M	2.546E+01	NOT IDENT.
I-126	1.775E+00	NOT IDENT.
SB-126	1.210E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.604E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	8.363E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	1.108E-01	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	7.417E-01	FAIL ABUN
BA-137M	6.272E-02	NOT IDENT.
CS-137	6.626E-02	NOT IDENT.
LA-138	1.143E-01	FAIL ABUN
CE-139	6.000E-02	NOT IDENT.
BA-140	1.500E+00	NOT IDENT.
LA-140	5.592E-01	FAIL ABUN
CE-141	1.942E-01	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	4.061E-01	NOT IDENT.
PM-144	5.558E-02	NOT IDENT.
PR-144	4.217E+00	NOT IDENT.
PM-146	8.596E-02	NOT IDENT.
ND-147	4.589E+00	FAIL ABUN
PM-147	1.344E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	5.113E-02	FAIL ABUN
EU-152	1.551E-01	FAIL ABUN
GD-153	1.714E-01	FAIL ABUN
EU-154	2.141E-01	FAIL ABUN
EU-155	2.037E-01	FAIL ABUN
TB-160	3.204E-01	FAIL ABUN

HO-166M	1.014E-01	FAIL ABUN
TM-171	7.452E+01	NOT IDENT.
HF-172	3.592E-01	FAIL ABUN
LU-172	1.363E-01	FAIL ABUN
LU-176	5.562E-02	FAIL ABUN
HF-181	1.431E-01	NOT IDENT.
TA-182	2.280E-01	FAIL ABUN
RE-183	8.553E-01	NOT IDENT.
RE-184	3.803E-01	FAIL ABUN
W-188	1.544E+01	FAIL ABUN
IR-192	7.655E-02	FAIL ABUN
HG-203	1.088E-01	NOT IDENT.
TL-204	1.195E+01	NOT IDENT.
BI-207	8.728E-02	FAIL ABUN
BI-210	1.934E+01	NOT IDENT.
PB-210	1.934E+01	NOT IDENT.
PB-211	1.543E+00	NOT IDENT.
BI-213	1.935E-01	NOT IDENT.
RN-219	7.706E-01	FAIL ABUN
RA-223	1.512E+00	FAIL ABUN
AC-225	5.641E+00	NOT IDENT.
AC-227	5.094E-01	FAIL ABUN
TH-227	5.094E-01	FAIL ABUN
TH-229	1.042E+00	FAIL ABUN
TH-231	1.512E+00	FAIL ABUN
PA-233	1.269E-01	FAIL ABUN
PA-234	5.328E-01	FAIL ABUN
PA-234M	8.352E+00	NOT IDENT.
NP-237	1.269E-01	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	5.056E-01	FAIL ABUN
PU-239	7.170E+02	FAIL ABUN
AM-241	4.851E-01	NOT IDENT.
CM-243	1.968E-01	FAIL ABUN
BK-247	1.518E-01	NOT IDENT.
CM-247	7.249E-02	NOT IDENT.
CF-249	8.720E-02	NOT IDENT.
CF-251	2.649E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:12.12

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724004.CNF;1		
Acquisition date	: 28-FEB-2023 05:08:05	Sensitivity	: 3.000
Detector ID	: GAM40	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.52	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Nuclide Library	: SOLID
Sample ID	: G609724004	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 6.4740E+01 GRAM
		Quantity Err(%)	: 1.5446E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 25-OCT-2022 08:28:28	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM40_CAN.CNF;12		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.508E+01	3.022E+00	3.022E+00
CO-58	7.889E-02	1.022E-01	1.022E-01
CD-109	8.472E+00	2.866E+00	2.866E+00
SN-126	7.993E-01	2.670E-01	2.670E-01
TL-208	8.304E-01	2.173E-01	2.173E-01
BI-211	1.510E+01	2.181E+00	2.181E+00
BI-212	4.574E+00	2.079E+00	2.079E+00
PB-212	2.976E+00	4.012E-01	4.012E-01
BI-214	4.649E+00	6.248E-01	6.248E-01
PB-214	5.481E+00	7.866E-01	7.866E-01
RN-222	4.649E+00	6.248E-01	6.248E-01
RA-224	1.425E+01	3.005E+00	3.005E+00
RA-226	5.481E+00	7.866E-01	7.866E-01
AC-228	3.346E+00	7.984E-01	7.984E-01
RA-228	3.346E+00	7.984E-01	7.984E-01
TH-228	2.976E+00	4.012E-01	4.012E-01
TH-230	5.480E+00	7.866E-01	7.866E-01
PA-231	1.113E+00	1.451E+00	1.451E+00
TH-232	3.346E+00	7.984E-01	7.984E-01
TH-234	1.046E+01	8.374E+00	8.374E+00
U-234	5.480E+00	7.866E-01	7.866E-01
U-235	1.918E-01	6.411E-01	6.411E-01
U-238	1.046E+01	8.374E+00	8.374E+00
AM-243	7.854E-01	2.129E-01	2.129E-01
ANH-511	2.327E-01	1.366E-01	1.366E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-3.524E-01	9.956E-01	1.008E+00	NOT IDENT.
NA-22	-5.242E-02	1.015E-01	1.042E-01	NOT IDENT.
NA-24	1.332E+17	2.582E+17	0.000E+00	SHORT HLIF
AL-26	2.543E-02	7.667E-02	7.753E-02	NOT IDENT.
SC-46	2.881E-02	1.196E-01	1.203E-01	FAIL ABUN

V-48	-6.897E-03	4.575E-01	4.575E-01	NOT IDENT.
CR-51	1.318E+00	1.859E+00	1.952E+00	NOT IDENT.
MN-52	1.024E+01	1.086E+01	1.180E+01	FAIL ABUN
MN-54	1.068E-02	9.428E-02	9.440E-02	NOT IDENT.
CO-56	7.742E-02	1.196E-01	1.246E-01	FAIL ABUN
MN-56	1.000E+41	1.538E+41	0.000E+00	SHORT HLIF
CO-57	1.406E-02	6.405E-02	6.437E-02	NOT IDENT.
FE-59	1.306E-01	2.822E-01	2.883E-01	NOT IDENT.
CO-60	6.299E-02	9.201E-02	9.629E-02	FAIL ABUN
ZN-65	2.724E-01	1.839E-01	2.211E-01	NOT IDENT.
GE-68	-1.587E+00	2.960E+00	3.046E+00	NOT IDENT.
AS-73	2.861E+00	5.167E+00	5.326E+00	NOT IDENT.
AS-74	-1.190E-01	5.357E-01	5.383E-01	NOT IDENT.
SE-75	5.438E-02	1.263E-01	1.287E-01	NOT IDENT.
BR-77	4.554E+05	5.129E+05	5.525E+05	SHORT HLIF
SR-82	-1.000E+00	1.475E+00	1.542E+00	NOT IDENT.
RB-83	3.459E-02	1.663E-01	1.670E-01	NOT IDENT.
RB-84	1.803E-02	3.180E-01	3.181E-01	NOT IDENT.
KR-85	2.078E+01	1.732E+01	1.969E+01	NOT IDENT.
SR-85	1.408E-01	1.176E-01	1.336E-01	NOT IDENT.
RB-86	-2.262E+00	4.220E+00	4.342E+00	NOT IDENT.
Y-88	-1.722E-03	7.107E-02	7.108E-02	NOT IDENT.
Y-91	-2.655E+01	5.202E+01	5.338E+01	NOT IDENT.
NB-94	3.692E-02	7.809E-02	7.984E-02	NOT IDENT.
NB-95	-1.013E-01	1.594E-01	1.658E-01	NOT IDENT.
NB-95M	-1.054E-01	4.598E-01	4.623E-01	NOT IDENT.
ZR-95	9.567E-02	2.514E-01	2.551E-01	NOT IDENT.
NB-97	1.000E+41	1.374E+41	0.000E+00	SHORT HLIF
ZR-97	2.861E+16	4.549E+16	0.000E+00	SHORT HLIF
MO-99	-2.968E+03	1.061E+04	1.069E+04	SHORT HLIF
TC-99M	1.000E+41	2.884E+41	0.000E+00	SHORT HLIF
RH-101	6.055E-02	8.008E-02	8.460E-02	FAIL ABUN
RH-102	4.795E-02	1.343E-01	1.360E-01	NOT IDENT.
RU-103	2.894E-02	1.452E-01	1.457E-01	FAIL ABUN
RH-106	7.804E-01	7.732E-01	8.495E-01	NOT IDENT.
RU-106	7.804E-01	7.732E-01	8.495E-01	NOT IDENT.
AG-108M	-2.609E-02	6.606E-02	6.710E-02	FAIL ABUN
AG-110	7.942E-01	1.833E+00	1.868E+00	NOT IDENT.
AG-110M	1.098E-01	1.358E-01	1.446E-01	FAIL ABUN
SN-113	7.641E-03	1.243E-01	1.243E-01	NOT IDENT.
CD-115	1.675E+04	3.997E+04	4.068E+04	SHORT HLIF
SN-117M	3.209E-03	4.978E-01	4.978E-01	FAIL ABUN
SB-122	-2.403E+02	2.029E+03	2.032E+03	SHORT HLIF
TE-123M	1.701E-02	8.449E-02	8.484E-02	NOT IDENT.
SB-124	-1.655E-01	3.017E-01	3.108E-01	FAIL ABUN
SB-125	1.276E-01	2.437E-01	2.504E-01	FAIL ABUN
TE-125M	-3.134E+00	3.289E+01	3.292E+01	NOT IDENT.
I-126	1.486E+00	1.987E+00	2.097E+00	NOT IDENT.
SB-126	8.839E-01	1.522E+00	1.574E+00	NOT IDENT.
SB-127	7.202E+01	1.936E+02	1.963E+02	SHORT HLIF
I-131	-2.511E-01	1.963E+00	1.966E+00	NOT IDENT.
I-132	1.000E+41	3.286E+41	0.000E+00	SHORT HLIF
TE-132	-1.328E+02	2.945E+02	3.005E+02	SHORT HLIF
BA-133	2.220E-02	1.090E-01	1.095E-01	NOT IDENT.
I-133	1.255E+12	2.154E+12	2.227E+12	SHORT HLIF
CS-134	3.496E-01	1.618E-01	2.259E-01	FAIL ABUN
I-135	-1.000E+41	1.769E+41	0.000E+00	SHORT HLIF
CS-136	5.176E-02	8.700E-01	8.703E-01	FAIL ABUN
BA-137M	-1.938E-02	9.122E-02	9.164E-02	NOT IDENT.
CS-137	-2.047E-02	9.637E-02	9.681E-02	NOT IDENT.
LA-138	3.531E-02	1.290E-01	1.300E-01	FAIL ABUN
CE-139	-8.833E-02	8.756E-02	9.619E-02	NOT IDENT.
BA-140	-1.116E+00	2.294E+00	2.348E+00	NOT IDENT.
LA-140	-3.304E-01	7.756E-01	7.897E-01	FAIL ABUN
CE-141	9.945E-02	3.325E-01	3.355E-01	FAIL ABUN
CE-143	5.127E+07	4.730E+07	5.264E+07	SHORT HLIF
CE-144	2.653E-01	5.407E-01	5.538E-01	NOT IDENT.
PM-144	-7.136E-02	8.174E-02	8.785E-02	NOT IDENT.
PR-144	-5.387E+00	6.197E+00	6.655E+00	NOT IDENT.
PM-146	3.538E-02	1.006E-01	1.018E-01	NOT IDENT.
ND-147	5.419E-01	6.177E+00	6.182E+00	FAIL ABUN
PM-147	1.138E+02	1.717E+03	1.718E+03	NOT IDENT.
PM-149	-3.131E+04	3.503E+05	3.505E+05	SHORT HLIF
EU-150	-5.455E-02	7.518E-02	7.910E-02	FAIL ABUN
EU-152	-1.817E-01	2.353E-01	2.492E-01	FAIL ABUN
GD-153	3.457E-01	3.501E-01	3.832E-01	FAIL ABUN
EU-154	-1.406E-01	2.853E-01	2.923E-01	FAIL ABUN
EU-155	4.265E-02	2.575E-01	2.582E-01	FAIL ABUN

TB-160	1.835E-01	3.616E-01	3.709E-01	FAIL ABUN
HO-166M	-2.294E-03	1.266E-01	1.266E-01	FAIL ABUN
TM-171	1.110E+01	9.340E+01	9.353E+01	NOT IDENT.
HF-172	-4.742E-02	5.056E-01	5.061E-01	FAIL ABUN
LU-172	7.358E-02	1.498E-01	1.534E-01	FAIL ABUN
LU-176	4.666E-02	6.279E-02	6.622E-02	FAIL ABUN
HF-181	1.517E-01	1.578E-01	1.720E-01	NOT IDENT.
TA-182	-3.560E-01	4.396E-01	4.680E-01	FAIL ABUN
RE-183	-1.922E-02	1.084E+00	1.084E+00	NOT IDENT.
RE-184	1.712E-01	4.459E-01	4.525E-01	FAIL ABUN
W-188	-2.226E+01	2.347E+01	2.552E+01	FAIL ABUN
IR-192	1.420E-01	1.878E-01	1.984E-01	FAIL ABUN
HG-203	5.871E-02	1.253E-01	1.281E-01	NOT IDENT.
TL-204	-9.316E-01	1.647E+01	1.648E+01	NOT IDENT.
BI-207	-8.786E-02	1.189E-01	1.253E-01	FAIL ABUN
BI-210	-6.838E+00	2.592E+01	2.610E+01	NOT IDENT.
PB-210	-6.838E+00	2.592E+01	2.610E+01	NOT IDENT.
PB-211	6.592E-01	1.994E+00	2.016E+00	NOT IDENT.
BI-213	4.038E-02	2.553E-01	2.559E-01	NOT IDENT.
RN-219	-7.089E-01	1.014E+00	1.063E+00	FAIL ABUN
RA-223	1.525E+00	2.025E+00	2.139E+00	FAIL ABUN
AC-225	3.932E-01	7.353E+00	7.355E+00	NOT IDENT.
AC-227	2.577E-01	6.458E-01	6.561E-01	FAIL ABUN
TH-227	2.577E-01	6.458E-01	6.561E-01	FAIL ABUN
TH-229	2.005E-01	1.342E+00	1.345E+00	FAIL ABUN
TH-231	1.525E+00	2.025E+00	2.139E+00	FAIL ABUN
PA-233	7.543E-02	1.595E-01	1.631E-01	FAIL ABUN
PA-234	-8.814E-02	7.003E-01	7.014E-01	FAIL ABUN
PA-234M	4.093E+00	9.707E+00	9.881E+00	NOT IDENT.
NP-237	7.543E-02	1.595E-01	1.631E-01	FAIL ABUN
NP-238	-1.061E+03	1.126E+05	1.126E+05	SHORT HLIF
NP-239	-8.143E-02	6.560E-01	6.571E-01	FAIL ABUN
PU-239	9.923E+02	9.732E+02	1.071E+03	FAIL ABUN
AM-241	-1.343E-01	6.752E-01	6.779E-01	NOT IDENT.
CM-243	-5.433E-02	2.783E-01	2.793E-01	FAIL ABUN
BK-247	2.535E-02	1.977E-01	1.980E-01	NOT IDENT.
CM-247	-5.081E-02	9.356E-02	9.632E-02	NOT IDENT.
CF-249	1.729E-02	1.038E-01	1.041E-01	NOT IDENT.
CF-251	1.624E-01	3.316E-01	3.395E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	74.5593	85.43	86.7852	131.20	89.9500
45.60	79.6428	86.55	86.9512	133.02	66.8933
46.54	83.5889	86.79	86.9863	133.52	71.3008
49.72	0.0000	86.94	87.0085	136.00	78.8236
51.35	70.3187	87.09	87.0306	136.47	72.2983
51.87	63.7449	87.57	87.1009	140.51	0.0000
52.39	75.2535	88.03	87.1686	143.76	85.1093
52.97	86.8010	88.34	87.2135	144.24	85.1599
53.44	71.6171	88.47	87.2324	145.44	70.8848
54.07	68.8519	89.96	87.4492	152.43	98.2762
57.36	0.0000	1093.63	87.5469	153.25	87.9370
57.53	75.1706	91.11	87.6146	323.87	82.8119
57.98	88.7498	92.59	87.8262	156.02	88.2185
59.27	92.8685	93.35	87.9349	158.56	97.8471
59.32	92.8784	94.56	88.1058	159.00	85.5186
59.54	92.9227	94.65	88.1185	162.33	108.4277
60.96	82.8486	94.67	88.1211	162.66	100.5596
61.17	82.8857	94.87	88.1497	163.33	71.2355
62.93	98.4658	97.43	71.9126	165.86	96.3811
63.29	98.5392	98.43	72.0247	176.31	94.0317
63.58	98.5981	98.44	72.0263	176.60	88.3251
64.28	98.7405	99.53	72.1480	177.52	74.6326
66.73	89.0791	100.11	72.2131	181.07	0.0000
67.24	97.0384	102.03	79.3897	181.52	67.6427
125.81	97.1227	103.18	66.9712	184.41	82.1068
67.75	96.4800	103.37	78.1558	143.76	82.2162
68.89	102.6178	105.21	73.4735	193.51	75.8595
69.67	114.6335	105.31	75.5843	197.03	84.3201
70.82	97.7212	106.12	80.9307	198.01	82.0569
70.83	97.7234	106.47	82.0240	201.83	81.1837
72.81	105.3846	109.28	88.6989	203.43	74.2386
72.87	105.3967	111.00	94.2128	205.31	67.6818
74.66	105.7517	111.76	0.0000	210.85	56.9604
74.82	105.7833	114.06	88.2464	215.65	60.7897
74.97	105.8124	116.30	0.0000	218.12	60.9275
77.11	106.2309	116.74	82.1761	222.11	55.1528
78.74	106.5455	119.76	70.7313	227.09	52.9899
79.69	100.6859	121.12	67.6417	227.38	59.0264
80.03	100.7462	121.22	67.6508	228.16	0.0000
80.12	100.7637	121.78	72.0008	228.18	65.0956
80.19	98.7604	122.06	72.0279	116.74	65.0956
80.57	98.8269	122.92	69.9591	235.69	82.5108
81.00	100.9209	123.07	77.5091	235.96	76.0575
81.07	100.9338	265.00	79.7271	238.63	60.8238
81.75	86.9068	125.81	79.2337	238.98	0.0000
82.47	101.1826	127.23	75.7737	240.99	60.9459
83.79	86.5410	127.91	75.8418	242.00	60.9985
84.00	86.5723	129.30	75.9793	244.70	48.9099

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	42.1230	563.25	26.0971
252.80	41.0334	345.93	35.5800	564.24	0.0000
254.15	0.0000	351.06	39.6661	569.33	29.7375
256.23	51.8473	351.93	39.6881	946.00	29.7400
260.90	0.0000	355.39	0.0000	569.70	29.7437
264.66	45.9858	356.01	38.4661	583.19	23.9385
264.80	48.4763	364.49	34.6741	584.27	23.9502
265.00	48.4846	366.42	0.0000	595.83	22.0671
269.46	47.4072	372.51	34.8486	427.87	24.1230
270.03	47.4293	375.05	44.7479	602.52	0.0000
271.23	47.4733	377.52	34.9565	604.72	28.6971
273.65	56.3242	356.01	39.5912	607.14	18.1436
276.40	64.3891	388.16	43.3027	609.32	18.1604
277.37	61.0888	388.63	38.8034	610.33	18.1685
277.60	61.1007	391.69	37.9702	614.28	16.6826
278.00	58.6068	264.66	36.3558	618.01	20.2539
279.20	47.7667	401.81	46.3848	620.36	30.4114
279.54	49.4560	402.40	45.4905	621.93	15.2155
279.70	49.4620	404.85	38.2676	630.19	0.0000
280.46	56.2014	410.95	41.1465	631.29	20.3678
283.69	41.2032	413.71	42.5853	633.25	26.4993
284.31	47.1121	414.70	34.8210	634.78	22.4368
285.41	48.8348	423.72	39.6056	635.95	13.2645
285.90	0.0000	427.09	20.7632	636.99	16.3327
287.50	43.0084	427.87	29.0814	657.50	18.5295
290.67	58.3254	433.94	31.4959	657.76	17.5022
293.27	0.0000	439.40	23.6935	657.90	0.0000
351.93	44.5276	440.45	26.4961	661.66	21.6545
295.96	44.5522	453.88	28.0945	664.57	0.0000
879.38	66.3187	463.37	24.4723	666.33	18.5962
299.98	58.7255	468.07	27.1746	666.50	18.5977
300.09	58.7311	473.00	0.0000	667.71	0.0000
300.13	58.7325	475.06	17.9934	677.62	19.7182
301.36	47.2832	476.78	29.3842	685.70	0.0000
302.85	52.4512	477.60	29.3961	692.65	0.0000
256.23	58.4055	482.18	22.8120	695.00	19.8527
304.85	53.8087	487.02	25.7272	696.49	25.0918
306.78	40.1984	492.35	0.0000	696.51	25.0918
308.46	49.6656	497.08	26.8162	697.00	25.0967
311.90	37.3403	505.52	28.8531	697.30	19.8705
316.51	40.4757	507.63	0.0000	697.49	18.8262
319.41	46.5985	511.00	26.0379	702.65	17.8156
320.08	28.4903	514.00	18.8327	706.68	20.9920
321.04	43.1956	514.00	18.8327	711.68	15.7745
323.87	49.8586	520.40	16.4694	720.70	18.9946
325.23	51.9849	520.69	0.0000	721.93	0.0000
328.76	53.1516	522.65	0.0000	722.78	12.6729
333.37	36.5911	527.90	0.0000	722.91	12.6733
333.97	57.5231	528.26	20.4224	723.31	12.6753
334.37	54.9238	529.59	21.4083	724.19	12.6797
338.28	34.0893	529.87	0.0000	727.33	17.4554
338.32	34.0901	531.02	21.9095	733.00	19.0825
311.90	34.1393	537.26	23.4395	735.93	12.7354
340.48	34.1393	546.56	0.0000	333.97	20.1759
340.55	34.1409	552.55	26.5594	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	22.3561	949.00	6.8406	1384.29	10.7290
747.24	18.1178	667.71	0.0000	1408.01	0.0000
748.06	15.9912	962.31	12.0197	1434.09	3.8745
752.31	19.2188	964.08	10.3081	1435.80	5.8140
753.82	22.4347	966.17	10.3143	1457.56	0.0000
756.73	21.3892	911.20	10.3231	1460.82	6.8197
756.80	21.3892	983.53	12.6722	1489.16	4.9008
884.68	14.4756	984.45	0.0000	1505.03	6.2941
765.81	28.9698	1274.44	10.4070	1584.12	7.9971
766.42	20.9274	1001.03	9.2637	1596.21	8.0166
766.84	16.1005	1002.74	11.5853	1620.50	3.0209
772.60	0.0000	1004.73	12.7514	1621.92	8.0581
776.52	20.4650	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	8.1670
778.90	16.1700	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	12.2885	1764.49	3.1053
788.74	0.0000	1038.76	0.0000	1063.66	4.9737
792.07	0.0000	631.29	15.8390	1771.35	0.0000
795.86	6.5071	1048.07	14.0850	1791.20	0.0000
810.06	0.0000	1049.04	15.8489	1808.65	3.1304
810.29	0.0000	1050.41	18.4980	1810.72	0.0000
344.28	0.0000	1063.66	15.0306	1836.06	2.0973
810.76	26.1631	1077.00	15.0856		
815.77	6.5520	1077.34	15.0877		
1048.07	13.1167	1085.87	12.4542		
832.01	21.9613	1093.63	10.6978		
834.85	17.5859	1099.45	9.8217		
835.71	17.5911	1112.07	12.5431		
836.80	0.0000	1112.84	16.1301		
846.75	0.0000	1115.54	2.8697		
846.77	13.2422	1120.29	14.3662		
856.80	13.2866	1120.55	14.3672		
860.56	22.1720	1221.41	14.3701		
871.09	8.8994	1129.67	14.4023		
873.19	16.6980	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	8.9235	1173.23	13.6569		
880.51	10.7121	1177.95	12.7618		
881.60	15.0688	1189.05	13.7128		
883.24	25.1285	1204.77	11.9320		
884.68	13.4082	1221.41	11.7977		
889.28	11.7493	1231.02	4.9274		
894.76	8.9678	1235.36	8.8787		
898.04	13.4658	1238.28	9.2554		
900.72	11.2309	1260.41	0.0000		
903.28	11.2402	1271.87	6.5322		
911.20	11.2683	1274.44	14.0057		
912.08	11.2712	1274.54	14.0067		
923.98	0.0000	1291.59	7.5005		
926.50	14.7192	1298.22	0.0000		
929.11	20.3965	1312.11	7.5371		
935.54	6.8125	1332.49	10.6025		
937.49	6.8167	1362.66	0.0000		
944.13	9.1074	1365.19	7.6304		
946.00	13.6689	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:38.90

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724005.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM43.CNF;552
Background date : 26-FEB-2023 09:15:03
Sample date : 20-JAN-2023 11:30:00 Acquisition date : 28-FEB-2023 05:08:59
Sample ID : G609724005 Sample quantity : 7.40600E+01 GRAM
Detector name : GAM43 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.62 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2379916 Detector SN# :
Matrix Spike ID : LCS ID :

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	74.36*	101	71	0.84	148.93	143	18	2.79E-02	16.6	1.30E+00
2	1	76.48*	178	73	0.88	153.17	143	18	4.95E-02	10.5	
3	0	86.82	62	110	1.14	173.87	171	6	1.71E-02	30.1	
4	3	89.56	36	77	1.14	179.37	177	12	1.01E-02	39.7	1.68E+00
5	3	92.10*	69	122	1.33	184.45	177	12	1.91E-02	32.5	
6	0	98.97	28	43	1.31	198.19	196	5	7.67E-03	40.3	
7	0	128.84	20	81	0.91	258.00	254	8	5.64E-03	79.6	
8	0	176.09	23	81	1.31	352.59	348	9	6.28E-03	74.8	
9	0	185.94*	71	144	1.24	372.32	367	11	1.98E-02	35.7	
10	0	196.76	35	88	1.01	393.97	389	11	9.64E-03	55.1	
11	0	238.67*	295	144	1.06	477.86	473	9	8.21E-02	9.5	
12	0	242.01	94	77	1.12	484.55	482	8	2.61E-02	19.8	
13	0	270.05	61	59	3.91	540.68	534	14	1.69E-02	29.8	
14	0	295.24*	217	48	1.20	591.12	585	12	6.03E-02	9.4	
15	0	327.79*	27	40	2.26	656.25	653	9	7.62E-03	46.1	
16	0	339.33*	33	89	0.86	679.36	673	12	9.19E-03	59.1	
17	0	351.96*	335	23	1.21	704.64	699	10	9.29E-02	6.1	
18	3	463.02	24	33	2.33	926.94	922	15	6.64E-03	48.2	1.69E+00
19	3	466.63	15	6	1.35	934.15	922	15	4.24E-03	42.9	
20	0	511.22*	41	34	3.58	1023.40	1015	19	1.15E-02	42.3	
21	0	535.54	33	29	0.61	1072.06	1062	19	9.03E-03	43.1	
22	0	554.32	23	9	3.45	1109.65	1103	13	6.51E-03	34.1	
23	0	573.60	10	23	1.28	1148.24	1142	10	2.78E-03	94.3	
24	0	583.65*	80	33	1.66	1168.35	1163	11	2.22E-02	18.1	
25	0	609.67*	240	28	1.64	1220.42	1214	15	6.67E-02	8.0	
26	0	633.53	24	13	4.53	1268.16	1260	18	6.73E-03	40.8	
27	0	728.06*	35	21	3.07	1457.32	1450	17	9.65E-03	35.5	
28	0	807.33	11	12	0.89	1615.92	1607	16	3.04E-03	77.1	
29	0	912.14	67	20	2.96	1825.62	1818	16	1.85E-02	19.4	
30	0	970.33	37	19	1.91	1942.04	1935	13	1.04E-02	29.2	
31	0	993.32	14	6	1.15	1988.04	1982	12	3.89E-03	44.0	
32	0	1122.04	50	12	2.40	2245.53	2236	17	1.38E-02	21.8	
33	0	1379.96	16	7	0.71	2761.35	2753	14	4.49E-03	42.6	
34	0	1409.15	9	2	0.63	2819.73	2814	10	2.40E-03	48.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1462.26*	168	5	2.92	2925.95	2915	20	4.65E-02	8.5	
36	0	1767.25	26	3	1.65	3535.73	3527	16	7.29E-03	22.9	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:09:40

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724005.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 20-JAN-2023 11:30:00	Acquisition date	: 28-FEB-2023 05:08:59
Sample ID	: G609724005	Sample quantity	: 74.060 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA43	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.62 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	154	10.66*	1.008E+00	1.451E+01	1.451E+01	17.06
CD-109	88.03	51	3.70*	4.717E+00	2.969E+00	3.147E+00	60.19
SN-126	64.28	------	9.60	2.046E+00	------ Line Not Found		------
	86.94	51	8.90	4.717E+00	1.234E+00	1.234E+00	60.19
	87.57	51	37.00*	4.717E+00	2.969E-01	2.969E-01	60.19
TL-208	277.37	------	6.60	4.237E+00	------ Line Not Found		------
	583.19	71	85.00*	2.346E+00	3.615E-01	3.615E-01	36.29
	860.56	------	12.50	1.654E+00	------ Line Not Found		------
BI-211	72.87	83	1.23	3.355E+00	2.039E+01	2.039E+01	33.22
	351.06	292	12.92*	3.527E+00	6.507E+00	6.507E+00	12.29
BI-212	727.33	31	6.67*	1.932E+00	2.450E+00	2.450E+00	71.07
	1620.50	------	1.47	9.333E-01	------ Line Not Found		------
PB-212	74.82	83	10.28	3.355E+00	2.439E+00	2.439E+00	33.22
	77.11	147	17.10	3.615E+00	2.416E+00	2.416E+00	20.91
	238.63	255	43.60*	4.739E+00	1.249E+00	1.249E+00	18.90
	300.09	------	3.30	3.990E+00	------ Line Not Found		------
PB-214	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
RA-224	240.99	81	4.10*	4.691E+00	4.268E+00	4.268E+00	39.68
RA-226	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
AC-228	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
RA-228	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
TH-228	74.82	83	10.28	3.355E+00	2.439E+00	2.439E+00	33.22
	77.11	147	17.10	3.615E+00	2.416E+00	2.416E+00	20.91
	238.63	255	43.60*	4.739E+00	1.249E+00	1.249E+00	18.90
	300.09	------	3.30	3.990E+00	------ Line Not Found		------
TH-229	85.43	51	14.70	4.717E+00	7.473E-01	7.473E-01	60.19
	88.47	30	24.00	4.956E+00	2.579E-01	2.579E-01	79.30
	193.51	------	4.41*	5.464E+00	------ Line Not Found		------
	210.85	------	2.80	5.169E+00	------ Line Not Found		------
TH-230	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
TH-232	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
U-234	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
U-235	89.96	30	3.47	4.956E+00	1.784E+00	1.784E+00	79.30
	93.35	57	5.60	5.157E+00	2.008E+00	2.008E+00	64.92
	143.76	------	10.96*	6.248E+00	------ Line Not Found		------
	163.33	------	5.08	5.984E+00	------ Line Not Found		------
	185.72	61	57.20	5.597E+00	1.929E-01	1.929E-01	71.38
	205.31	------	5.01	5.262E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	1.643E-01	------ Line Not Found		------
	74.66	83	67.20*	3.355E+00	3.731E-01	3.731E-01	33.22
ANH-511	511.00	37	100.00*	2.620E+00	1.418E-01	1.418E-01	84.65

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:41.37

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724005.CNF;1		
Acquisition date	: 28-FEB-2023 05:08:59	Sensitivity	: 3.000
Detector ID	: GAM43	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.62	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Analyst initials	: RXF2
Sample ID	: G609724005	Sample Quantity	: 7.4060E+01 GRAM
Batch Number	: 2379916	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	: 26-JUL-2022 10:46:43	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;20		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.451E+01	2.427E+00	1.352E+00
CD-109	3.147E+00	1.856E+00	2.247E+00
SN-126	2.969E-01	1.751E-01	2.136E-01
TL-208	3.615E-01	1.286E-01	1.214E-01
BI-211	6.507E+00	7.838E-01	5.606E-01
BI-212	2.450E+00	1.707E+00	1.713E+00
PB-212	1.249E+00	2.315E-01	1.931E-01
PB-214	2.361E+00	2.845E-01	2.039E-01
RA-224	4.268E+00	1.660E+00	2.278E+00
RA-226	2.361E+00	2.845E-01	2.039E-01
AC-228	1.514E+00	5.748E-01	4.902E-01
RA-228	1.514E+00	5.748E-01	4.902E-01
TH-228	1.249E+00	2.315E-01	1.931E-01
TH-229	1.464E-01	7.702E-01	1.307E+00
TH-230	2.361E+00	2.844E-01	2.039E-01
TH-232	1.514E+00	5.748E-01	4.902E-01
U-234	2.361E+00	2.844E-01	2.039E-01
U-235	3.702E-02	3.560E-01	5.968E-01
AM-243	3.731E-01	1.215E-01	1.703E-01
ANH-511	1.418E-01	1.177E-01	9.360E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	2.536E-01	7.869E-01	1.527E+00	NOT IDENT.
NA-22	2.004E-02	7.963E-02	1.612E-01	NOT IDENT.
NA-24	0.000E+00	3.199E+17	0.000E+00	SHORT HLIF
AL-26	-4.630E-02	6.619E-02	1.092E-01	NOT IDENT.
SC-46	-2.249E-02	9.418E-02	1.751E-01	FAIL ABUN
V-48	1.558E-01	3.035E-01	6.600E-01	NOT IDENT.
CR-51	6.857E-01	1.139E+00	2.160E+00	NOT IDENT.
MN-52	2.187E-01	8.436E+00	1.749E+01	NOT IDENT.
MN-54	-1.782E-02	8.654E-02	1.509E-01	NOT IDENT.
CO-56	-3.559E-03	8.959E-02	1.656E-01	NOT IDENT.

MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-9.396E-03	4.268E-02	7.098E-02	NOT IDENT.
CO-58	-2.633E-02	9.230E-02	1.396E-01	NOT IDENT.
FE-59	-1.799E-01	2.437E-01	4.050E-01	NOT IDENT.
CO-60	-6.452E-02	7.781E-02	1.213E-01	NOT IDENT.
ZN-65	-2.196E-01	2.284E-01	2.836E-01	NOT IDENT.
GE-68	9.126E-01	2.237E+00	4.704E+00	NOT IDENT.
AS-73	1.413E+00	3.274E+00	6.058E+00	NOT IDENT.
AS-74	9.636E-02	3.927E-01	7.615E-01	FAIL ABUN
SE-75	-2.788E-02	9.322E-02	1.442E-01	NOT IDENT.
BR-77	0.000E+00	3.542E+04	0.000E+00	SHORT HLIF
SR-82	-2.743E-01	1.201E+00	2.132E+00	NOT IDENT.
RB-83	5.022E-02	1.648E-01	3.168E-01	NOT IDENT.
RB-84	-5.738E-02	2.194E-01	4.012E-01	NOT IDENT.
KR-85	1.879E+01	1.418E+01	2.931E+01	NOT IDENT.
SR-85	1.274E-01	9.631E-02	1.991E-01	NOT IDENT.
RB-86	3.153E-01	3.292E+00	6.533E+00	NOT IDENT.
Y-88	-1.395E-03	7.380E-02	1.606E-01	NOT IDENT.
Y-91	1.701E+01	5.188E+01	1.037E+02	NOT IDENT.
NB-94	4.923E-02	6.718E-02	1.340E-01	NOT IDENT.
NB-95	3.401E-02	1.114E-01	2.100E-01	NOT IDENT.
NB-95M	2.515E-01	2.744E-01	4.868E-01	NOT IDENT.
ZR-95	1.352E-01	1.468E-01	3.193E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.018E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	9.249E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-3.240E-03	5.001E-02	7.794E-02	FAIL ABUN
RH-102	2.592E-02	9.416E-02	1.837E-01	NOT IDENT.
RU-103	3.463E-02	1.000E-01	1.972E-01	FAIL ABUN
RH-106	8.205E-02	5.548E-01	1.064E+00	NOT IDENT.
RU-106	8.205E-02	5.548E-01	1.064E+00	NOT IDENT.
AG-108M	-6.109E-03	5.531E-02	9.557E-02	NOT IDENT.
AG-110	7.427E-01	1.441E+00	2.854E+00	NOT IDENT.
AG-110M	-2.180E-02	9.195E-02	1.732E-01	NOT IDENT.
SN-113	1.446E-02	8.843E-02	1.599E-01	NOT IDENT.
CD-115	0.000E+00	2.658E+04	0.000E+00	SHORT HLIF
SN-117M	7.591E-02	2.964E-01	5.055E-01	NOT IDENT.
SB-122	0.000E+00	1.436E+03	0.000E+00	SHORT HLIF
TE-123M	1.947E-02	5.242E-02	9.048E-02	NOT IDENT.
SB-124	3.768E-02	2.378E-01	5.091E-01	NOT IDENT.
SB-125	-3.774E-02	1.882E-01	3.193E-01	FAIL ABUN
TE-125M	8.377E+00	1.918E+01	3.432E+01	NOT IDENT.
I-126	1.533E+00	1.448E+00	3.040E+00	NOT IDENT.
SB-126	2.075E-01	1.243E+00	2.144E+00	NOT IDENT.
SB-127	0.000E+00	1.755E+02	0.000E+00	SHORT HLIF
I-131	1.350E+00	1.369E+00	2.771E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.872E+02	0.000E+00	SHORT HLIF
BA-133	4.669E-02	7.328E-02	1.295E-01	NOT IDENT.
I-133	0.000E+00	1.397E+12	0.000E+00	SHORT HLIF
CS-134	1.073E-01	8.364E-02	1.795E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	6.093E-01	6.555E-01	1.463E+00	FAIL ABUN
BA-137M	-7.509E-02	6.366E-02	9.572E-02	NOT IDENT.
CS-137	-7.933E-02	6.725E-02	1.011E-01	NOT IDENT.
LA-138	2.176E-02	1.033E-01	2.231E-01	NOT IDENT.
CE-139	3.217E-02	5.221E-02	9.241E-02	NOT IDENT.
BA-140	1.639E+00	1.582E+00	3.379E+00	NOT IDENT.
LA-140	-4.743E-01	5.790E-01	9.358E-01	FAIL ABUN
CE-141	-3.694E-02	1.767E-01	2.886E-01	NOT IDENT.
CE-143	0.000E+00	3.649E+07	0.000E+00	SHORT HLIF
CE-144	-8.934E-02	2.993E-01	4.925E-01	NOT IDENT.
PM-144	5.419E-02	6.510E-02	1.339E-01	NOT IDENT.
PR-144	4.156E+00	4.940E+00	1.017E+01	NOT IDENT.
PM-146	6.342E-03	8.042E-02	1.421E-01	FAIL ABUN
ND-147	1.408E+00	3.978E+00	7.261E+00	FAIL ABUN
PM-147	7.706E+02	1.153E+03	2.089E+03	NOT IDENT.
PM-149	0.000E+00	2.663E+05	0.000E+00	SHORT HLIF
EU-150	-3.156E-02	5.397E-02	7.771E-02	FAIL ABUN
EU-152	-2.512E-01	2.223E-01	2.900E-01	FAIL ABUN
GD-153	-4.464E-02	1.449E-01	2.239E-01	NOT IDENT.
EU-154	4.582E-02	2.206E-01	4.439E-01	NOT IDENT.
EU-155	8.663E-02	1.687E-01	3.026E-01	FAIL ABUN
TB-160	4.829E-02	2.997E-01	5.978E-01	FAIL ABUN
HO-166M	-3.765E-02	9.809E-02	1.720E-01	NOT IDENT.
TM-171	1.644E+01	5.774E+01	1.062E+02	NOT IDENT.
HF-172	-1.502E-01	3.228E-01	4.766E-01	FAIL ABUN

LU-172	5.423E-02	1.320E-01	2.673E-01	FAIL ABUN
LU-176	3.794E-02	4.318E-02	8.454E-02	FAIL ABUN
HF-181	-3.549E-02	1.130E-01	2.045E-01	NOT IDENT.
TA-182	-1.217E-02	4.702E-01	8.703E-01	FAIL ABUN
RE-183	-2.778E-01	7.075E-01	1.216E+00	NOT IDENT.
RE-184	1.141E-02	3.516E-01	6.886E-01	NOT IDENT.
W-188	-1.046E+01	1.719E+01	2.509E+01	NOT IDENT.
IR-192	-2.346E-02	8.187E-02	1.405E-01	FAIL ABUN
HG-203	8.020E-03	9.048E-02	1.632E-01	FAIL ABUN
TL-204	-2.835E+00	1.046E+01	1.654E+01	NOT IDENT.
BI-207	-8.085E-03	9.776E-02	1.858E-01	FAIL ABUN
BI-210	5.221E+00	1.550E+01	2.861E+01	NOT IDENT.
PB-210	5.221E+00	1.550E+01	2.861E+01	NOT IDENT.
PB-211	6.113E-01	1.273E+00	2.375E+00	NOT IDENT.
BI-213	1.327E-01	2.034E-01	3.833E-01	NOT IDENT.
BI-214	0.000E+00	3.317E-01	7.334E-01	FAIL ABUN
RN-219	2.123E-01	7.349E-01	1.339E+00	FAIL ABUN
RN-222	0.000E+00	3.317E-01	7.334E-01	FAIL ABUN
RA-223	1.278E+00	1.190E+00	2.180E+00	FAIL ABUN
AC-225	-1.389E+00	4.925E+00	8.466E+00	NOT IDENT.
AC-227	-2.560E-01	4.200E-01	7.097E-01	NOT IDENT.
TH-227	-2.560E-01	4.200E-01	7.097E-01	NOT IDENT.
PA-231	1.193E-01	8.537E-01	1.534E+00	NOT IDENT.
TH-231	1.278E+00	1.190E+00	2.180E+00	FAIL ABUN
PA-233	-5.444E-02	9.834E-02	1.650E-01	FAIL ABUN
PA-234	4.475E-02	5.593E-01	1.096E+00	FAIL ABUN
PA-234M	-4.376E+00	8.815E+00	1.555E+01	NOT IDENT.
TH-234	1.347E+00	3.210E+00	5.892E+00	FAIL ABUN
NP-237	-5.444E-02	9.834E-02	1.650E-01	FAIL ABUN
NP-238	0.000E+00	7.420E+04	0.000E+00	SHORT HLIF
U-238	1.347E+00	3.210E+00	5.892E+00	FAIL ABUN
NP-239	-1.942E-01	4.202E-01	6.843E-01	FAIL ABUN
PU-239	4.346E+02	6.783E+02	1.019E+03	FAIL ABUN
AM-241	1.725E-01	4.059E-01	7.404E-01	NOT IDENT.
CM-243	-4.261E-02	1.773E-01	2.972E-01	FAIL ABUN
BK-247	-6.669E-02	1.468E-01	2.219E-01	NOT IDENT.
CM-247	3.468E-03	7.059E-02	1.244E-01	NOT IDENT.
CF-249	6.805E-04	7.241E-02	1.278E-01	NOT IDENT.
CF-251	1.959E-01	2.871E-01	3.687E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:39.83

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	154	10.66*	1.008E+00	1.451E+01	1.451E+01	17.06
CD-109	88.03	51	3.70*	4.717E+00	2.969E+00	3.147E+00	60.19
SN-126	64.28	------	9.60	2.046E+00	------ Line Not Found		------
	86.94	51	8.90	4.717E+00	1.234E+00	1.234E+00	60.19
	87.57	51	37.00*	4.717E+00	2.969E-01	2.969E-01	60.19
TL-208	277.37	------	6.60	4.237E+00	------ Line Not Found		------
	583.19	71	85.00*	2.346E+00	3.615E-01	3.615E-01	36.29
	860.56	------	12.50	1.654E+00	------ Line Not Found		------
BI-211	72.87	83	1.23	3.355E+00	2.039E+01	2.039E+01	33.22
	351.06	292	12.92*	3.527E+00	6.507E+00	6.507E+00	12.29
BI-212	727.33	31	6.67*	1.932E+00	2.450E+00	2.450E+00	71.07
	1620.50	------	1.47	9.333E-01	------ Line Not Found		------
PB-212	74.82	83	10.28	3.355E+00	2.439E+00	2.439E+00	33.22
	77.11	147	17.10	3.615E+00	2.416E+00	2.416E+00	20.91
	238.63	255	43.60*	4.739E+00	1.249E+00	1.249E+00	18.90
	300.09	------	3.30	3.990E+00	------ Line Not Found		------
PB-214	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
RA-224	240.99	81	4.10*	4.691E+00	4.268E+00	4.268E+00	39.68
RA-226	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
AC-228	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
RA-228	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
TH-228	74.82	83	10.28	3.355E+00	2.439E+00	2.439E+00	33.22
	77.11	147	17.10	3.615E+00	2.416E+00	2.416E+00	20.91
	238.63	255	43.60*	4.739E+00	1.249E+00	1.249E+00	18.90
	300.09	------	3.30	3.990E+00	------ Line Not Found		------
TH-229	85.43	51	14.70	4.717E+00	7.473E-01	7.473E-01	60.19
	88.47	30	24.00	4.956E+00	2.579E-01	2.579E-01	79.30
	193.51	------	4.41*	5.464E+00	------ Line Not Found		------
	210.85	------	2.80	5.169E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-230	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
TH-232	105.21	------	1.10	5.899E+00	------ Line Not Found		------
	338.32	29	11.27	3.628E+00	7.163E-01	7.163E-01	118.13
	835.71	------	1.61	1.700E+00	------ Line Not Found		------
	911.20	60	25.80*	1.564E+00	1.514E+00	1.514E+00	38.75
	968.97	34	15.80	1.474E+00	1.477E+00	1.477E+00	58.33
U-234	74.82	83	5.80	3.355E+00	4.323E+00	4.323E+00	33.22
	77.11	147	9.70	3.615E+00	4.259E+00	4.259E+00	20.91
	87.09	51	3.41	4.717E+00	3.221E+00	3.221E+00	60.19
	242.00	81	7.25	4.691E+00	2.414E+00	2.414E+00	39.68
	295.22	189	18.42	4.040E+00	2.570E+00	2.570E+00	18.81
	351.93	292	35.60*	3.527E+00	2.361E+00	2.361E+00	12.29
U-235	89.96	30	3.47	4.956E+00	1.784E+00	1.784E+00	79.30
	93.35	57	5.60	5.157E+00	2.008E+00	2.008E+00	64.92
	143.76	------	10.96*	6.248E+00	------ Line Not Found		------
	163.33	------	5.08	5.984E+00	------ Line Not Found		------
	185.72	61	57.20	5.597E+00	1.929E-01	1.929E-01	71.38
	205.31	------	5.01	5.262E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	1.643E-01	------ Line Not Found		------
	74.66	83	67.20*	3.355E+00	3.731E-01	3.731E-01	33.22
ANH-511	511.00	37	100.00*	2.620E+00	1.418E-01	1.418E-01	84.65

Flag: "*" = Keyline

Sample ID : G609724005 Acquisition date : 28-FEB-2023 05:08:59

Total number of lines in spectrum 36
Number of unidentified lines 7
Number of lines tentatively identified by NID 29 80.56%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.451E+01	1.451E+01	0.248E+01	17.06	
CD-109	461.40D	1.06	2.969E+00	3.147E+00	1.894E+00	60.19	
SN-126	2.30E+05Y	1.00	2.969E-01	2.969E-01	1.787E-01	60.19	
TL-208	1.41E+10Y	1.00	3.615E-01	3.615E-01	1.312E-01	36.29	
BI-211	7.04E+08Y	1.00	6.507E+00	6.507E+00	0.800E+00	12.29	
BI-212	1.41E+10Y	1.00	2.450E+00	2.450E+00	1.741E+00	71.07	
PB-212	1.41E+10Y	1.00	1.249E+00	1.249E+00	0.236E+00	18.90	
PB-214	1600.00Y	1.00	2.361E+00	2.361E+00	0.290E+00	12.29	
RA-224	1.41E+10Y	1.00	4.268E+00	4.268E+00	1.693E+00	39.68	
RA-226	1600.00Y	1.00	2.361E+00	2.361E+00	0.290E+00	12.29	
AC-228	1.41E+10Y	1.00	1.514E+00	1.514E+00	0.587E+00	38.75	
RA-228	1.41E+10Y	1.00	1.514E+00	1.514E+00	0.587E+00	38.75	
TH-228	1.41E+10Y	1.00	1.249E+00	1.249E+00	0.236E+00	18.90	
TH-229	7340.00Y	1.00	2.579E-01	2.579E-01	2.046E-01	79.30	K
TH-230	7.54E+04Y	1.00	2.361E+00	2.361E+00	0.290E+00	12.29	
TH-232	1.41E+10Y	1.00	1.514E+00	1.514E+00	0.587E+00	38.75	
U-234	2.45E+05Y	1.00	2.361E+00	2.361E+00	0.290E+00	12.29	
U-235	7.04E+08Y	1.00	1.929E-01	1.929E-01	1.377E-01	71.38	K
AM-243	7370.00Y	1.00	3.731E-01	3.731E-01	1.240E-01	33.22	
ANH-511	1.00E+09Y	1.00	1.418E-01	1.418E-01	1.201E-01	84.65	
	Total Activity :		4.882E+01	4.900E+01			

Grand Total Activity : 4.882E+01 4.900E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	98.97	23	36	1.31	198.19	196	5	7.67E-03	80.7	5.60E+00	T
0	128.84	17	68	0.91	258.00	254	8	5.64E-03	****	6.32E+00	T
0	176.09	19	69	1.31	352.59	348	9	6.28E-03	****	5.77E+00	T
0	196.76	30	76	1.01	393.97	389	11	9.64E-03	****	5.41E+00	T
0	270.05	53	51	3.91	540.68	534	14	1.69E-02	59.6	4.32E+00	T
0	327.79	24	35	2.26	656.25	653	9	7.62E-03	92.1	3.73E+00	T
3	463.02	21	29	2.33	926.94	922	15	6.64E-03	96.5	2.84E+00	T
3	466.63	13	5	1.35	934.15	922	15	4.24E-03	85.8	2.82E+00	T
0	535.54	29	25	0.61	1072.06	1062	19	9.03E-03	86.2	2.52E+00	
0	554.32	21	8	3.45	1109.65	1103	13	6.51E-03	68.1	2.45E+00	
0	573.60	9	20	1.28	1148.24	1142	10	2.78E-03	****	2.38E+00	
0	609.67	214	25	1.64	1220.42	1214	15	6.67E-02	16.0	2.26E+00	T
0	633.53	22	11	4.53	1268.16	1260	18	6.73E-03	81.6	2.19E+00	T
0	807.33	10	11	0.89	1615.92	1607	16	3.04E-03	****	1.76E+00	
0	993.32	13	5	1.15	1988.04	1982	12	3.89E-03	88.1	1.44E+00	
0	1122.04	45	11	2.40	2245.53	2236	17	1.38E-02	43.5	1.28E+00	T
0	1379.96	15	6	0.71	2761.35	2753	14	4.49E-03	85.2	1.06E+00	
0	1409.15	8	2	0.63	2819.73	2814	10	2.40E-03	96.2	1.04E+00	T
0	1767.25	24	3	1.65	3535.73	3527	16	7.29E-03	45.8	8.85E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:50.64

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*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
*                                                                   *
*                       DETECTOR AND SAMPLE DATA                    *
*                                                                   *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724005.CNF;1    *
* Acquisition date : 28-FEB-2023 05:08:59 Sensitivity     : 3.000            *
* Detector ID      : GAM43                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.62     Half life ratio : *****            *
* Sample date      : 20-JAN-2023 11:30:00 Nuclide Library : SOLID            *
* Sample ID        : G609724005           Analyst initials: RXF2             *
* Batch Number     : 2379916              Sample Quantity : 7.4060E+01 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*********************************************************************
*                                                                   *
*                       CALIBRATION INFORMATION                     *
*                                                                   *
* Eff. Cal. date   : 26-JUL-2022 10:46:43 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;20             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	5.510E-01
CD-109	1.046E+00
SN-126	9.944E-02
TL-208	5.403E-02
BI-211	2.513E-01
BI-212	7.529E-01
PB-212	9.020E-02
PB-214	9.142E-02
RA-224	1.071E+00
RA-226	9.142E-02
AC-228	2.120E-01
RA-228	2.120E-01
TH-228	9.020E-02
TH-229	5.987E-01
TH-230	9.142E-02
TH-232	2.120E-01
U-234	9.142E-02
U-235	2.793E-01
AM-243	7.944E-02
ANH-511	4.173E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	6.874E-01	NOT IDENT.
NA-22	6.841E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.912E-02	NOT IDENT.
SC-46	7.603E-02	FAIL ABUN
V-48	2.804E-01	NOT IDENT.
CR-51	9.874E-01	NOT IDENT.
MN-52	7.138E+00	NOT IDENT.
MN-54	6.687E-02	NOT IDENT.
CO-56	7.150E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF

CO-57	3.281E-02	NOT IDENT.
CO-58	5.858E-02	NOT IDENT.
FE-59	1.692E-01	NOT IDENT.
CO-60	4.813E-02	NOT IDENT.
ZN-65	1.188E-01	NOT IDENT.
GE-68	2.007E+00	NOT IDENT.
AS-73	2.809E+00	NOT IDENT.
AS-74	3.363E-01	FAIL ABUN
SE-75	6.570E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	9.256E-01	NOT IDENT.
RB-83	1.428E-01	NOT IDENT.
RB-84	1.733E-01	NOT IDENT.
KR-85	1.348E+01	NOT IDENT.
SR-85	9.152E-02	NOT IDENT.
RB-86	2.774E+00	NOT IDENT.
Y-88	6.010E-02	NOT IDENT.
Y-91	4.504E+01	NOT IDENT.
NB-94	6.030E-02	NOT IDENT.
NB-95	9.395E-02	NOT IDENT.
NB-95M	2.265E-01	NOT IDENT.
ZR-95	1.396E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.586E-02	FAIL ABUN
RH-102	8.079E-02	NOT IDENT.
RU-103	8.778E-02	FAIL ABUN
RH-106	4.670E-01	NOT IDENT.
RU-106	4.670E-01	NOT IDENT.
AG-108M	4.288E-02	NOT IDENT.
AG-110	1.271E+00	NOT IDENT.
AG-110M	7.388E-02	NOT IDENT.
SN-113	7.200E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.347E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	4.201E-02	NOT IDENT.
SB-124	2.058E-01	NOT IDENT.
SB-125	1.445E-01	FAIL ABUN
TE-125M	1.588E+01	NOT IDENT.
I-126	1.365E+00	NOT IDENT.
SB-126	9.599E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.251E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	5.861E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	8.066E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	6.371E-01	FAIL ABUN
BA-137M	4.079E-02	NOT IDENT.
CS-137	4.309E-02	NOT IDENT.
LA-138	9.148E-02	NOT IDENT.
CE-139	4.286E-02	NOT IDENT.
BA-140	1.511E+00	NOT IDENT.
LA-140	3.446E-01	FAIL ABUN
CE-141	1.344E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.257E-01	NOT IDENT.
PM-144	5.979E-02	NOT IDENT.
PR-144	4.542E+00	NOT IDENT.
PM-146	6.388E-02	FAIL ABUN
ND-147	3.169E+00	FAIL ABUN
PM-147	9.695E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.509E-02	FAIL ABUN
EU-152	1.311E-01	FAIL ABUN
GD-153	1.028E-01	NOT IDENT.
EU-154	1.879E-01	NOT IDENT.
EU-155	1.406E-01	FAIL ABUN
TB-160	2.591E-01	FAIL ABUN
HO-166M	7.348E-02	NOT IDENT.
TM-171	4.905E+01	NOT IDENT.
HF-172	2.192E-01	FAIL ABUN
LU-172	1.168E-01	FAIL ABUN

LU-176	3.867E-02	FAIL ABUN
HF-181	9.092E-02	NOT IDENT.
TA-182	3.820E-01	FAIL ABUN
RE-183	5.641E-01	NOT IDENT.
RE-184	2.968E-01	NOT IDENT.
W-188	1.137E+01	NOT IDENT.
IR-192	6.423E-02	FAIL ABUN
HG-203	7.476E-02	FAIL ABUN
TL-204	7.694E+00	NOT IDENT.
BI-207	7.952E-02	FAIL ABUN
BI-210	1.327E+01	NOT IDENT.
PB-210	1.327E+01	NOT IDENT.
PB-211	1.077E+00	NOT IDENT.
BI-213	1.744E-01	NOT IDENT.
BI-214	3.539E-01	FAIL ABUN
RN-219	6.064E-01	FAIL ABUN
RN-222	3.539E-01	FAIL ABUN
RA-223	1.002E+00	FAIL ABUN
AC-225	3.898E+00	NOT IDENT.
AC-227	3.240E-01	NOT IDENT.
TH-227	3.240E-01	NOT IDENT.
PA-231	7.048E-01	NOT IDENT.
TH-231	1.002E+00	FAIL ABUN
PA-233	7.364E-02	FAIL ABUN
PA-234	4.741E-01	FAIL ABUN
PA-234M	6.660E+00	NOT IDENT.
TH-234	2.764E+00	FAIL ABUN
NP-237	7.364E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	2.764E+00	FAIL ABUN
NP-239	3.157E-01	FAIL ABUN
PU-239	4.767E+02	FAIL ABUN
AM-241	3.453E-01	NOT IDENT.
CM-243	1.379E-01	FAIL ABUN
BK-247	1.009E-01	NOT IDENT.
CM-247	5.639E-02	NOT IDENT.
CF-249	5.773E-02	NOT IDENT.
CF-251	1.711E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:09:54.52

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724005.CNF;1		
Acquisition date	: 28-FEB-2023 05:08:59	Sensitivity	: 3.000
Detector ID	: GAM43	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.62	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Nuclide Library	: SOLID
Sample ID	: G609724005	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 7.4060E+01 GRAM
		Quantity Err(%)	: 1.3503E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 26-JUL-2022 10:46:43	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;20		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.451E+01	2.799E+00	2.799E+00
CD-109	3.147E+00	1.883E+00	1.883E+00
SN-126	2.969E-01	1.770E-01	1.770E-01
TL-208	3.615E-01	1.325E-01	1.325E-01
BI-211	6.507E+00	9.411E-01	9.411E-01
BI-212	2.450E+00	1.722E+00	1.722E+00
PB-212	1.249E+00	2.526E-01	2.526E-01
PB-214	2.361E+00	3.394E-01	3.394E-01
RA-224	4.268E+00	1.695E+00	1.695E+00
RA-226	2.361E+00	3.394E-01	3.394E-01
AC-228	1.514E+00	5.957E-01	5.957E-01
RA-228	1.514E+00	5.957E-01	5.957E-01
TH-228	1.249E+00	2.526E-01	2.526E-01
TH-229	1.464E-01	7.703E-01	7.703E-01
TH-230	2.361E+00	3.394E-01	3.394E-01
TH-232	1.514E+00	5.957E-01	5.957E-01
U-234	2.361E+00	3.394E-01	3.394E-01
U-235	3.702E-02	3.560E-01	3.560E-01
AM-243	3.731E-01	1.256E-01	1.256E-01
ANH-511	1.418E-01	1.183E-01	1.183E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	2.536E-01	7.872E-01	7.955E-01	NOT IDENT.
NA-22	2.004E-02	7.965E-02	8.016E-02	NOT IDENT.
NA-24	1.008E+17	3.201E+17	0.000E+00	SHORT HLIF
AL-26	-4.630E-02	6.628E-02	6.949E-02	NOT IDENT.
SC-46	-2.249E-02	9.420E-02	9.475E-02	FAIL ABUN
V-48	1.558E-01	3.039E-01	3.119E-01	NOT IDENT.
CR-51	6.857E-01	1.140E+00	1.181E+00	NOT IDENT.
MN-52	2.187E-01	8.436E+00	8.436E+00	NOT IDENT.
MN-54	-1.782E-02	8.656E-02	8.693E-02	NOT IDENT.
CO-56	-3.559E-03	8.959E-02	8.960E-02	NOT IDENT.

MN-56	-1.000E+41	2.106E+42	0.000E+00	SHORT HLIF
CO-57	-9.396E-03	4.269E-02	4.290E-02	NOT IDENT.
CO-58	-2.633E-02	9.233E-02	9.309E-02	NOT IDENT.
FE-59	-1.799E-01	2.445E-01	2.576E-01	NOT IDENT.
CO-60	-6.452E-02	7.804E-02	8.328E-02	NOT IDENT.
ZN-65	-2.196E-01	2.292E-01	2.496E-01	NOT IDENT.
GE-68	9.126E-01	2.238E+00	2.276E+00	NOT IDENT.
AS-73	1.413E+00	3.289E+00	3.350E+00	NOT IDENT.
AS-74	9.636E-02	3.929E-01	3.953E-01	FAIL ABUN
SE-75	-2.788E-02	9.324E-02	9.409E-02	NOT IDENT.
BR-77	1.912E+05	2.173E+05	2.338E+05	SHORT HLIF
SR-82	-2.743E-01	1.201E+00	1.208E+00	NOT IDENT.
RB-83	5.022E-02	1.650E-01	1.666E-01	NOT IDENT.
RB-84	-5.738E-02	2.195E-01	2.210E-01	NOT IDENT.
KR-85	1.879E+01	1.427E+01	1.660E+01	NOT IDENT.
SR-85	1.274E-01	9.695E-02	1.127E-01	NOT IDENT.
RB-86	3.153E-01	3.292E+00	3.296E+00	NOT IDENT.
Y-88	-1.395E-03	7.380E-02	7.380E-02	NOT IDENT.
Y-91	1.701E+01	5.189E+01	5.246E+01	NOT IDENT.
NB-94	4.923E-02	6.732E-02	7.089E-02	NOT IDENT.
NB-95	3.401E-02	1.115E-01	1.125E-01	NOT IDENT.
NB-95M	2.515E-01	2.755E-01	2.980E-01	NOT IDENT.
ZR-95	1.352E-01	1.473E-01	1.594E-01	NOT IDENT.
NB-97	1.000E+41	2.233E+41	0.000E+00	SHORT HLIF
ZR-97	3.237E+16	4.028E+16	0.000E+00	SHORT HLIF
MO-99	-1.352E+03	9.250E+03	9.270E+03	SHORT HLIF
TC-99M	-1.000E+41	4.360E+41	0.000E+00	SHORT HLIF
RH-101	-3.240E-03	5.002E-02	5.004E-02	FAIL ABUN
RH-102	2.592E-02	9.421E-02	9.493E-02	NOT IDENT.
RU-103	3.463E-02	1.001E-01	1.013E-01	FAIL ABUN
RH-106	8.205E-02	5.548E-01	5.560E-01	NOT IDENT.
RU-106	8.205E-02	5.548E-01	5.560E-01	NOT IDENT.
AG-108M	-6.109E-03	5.531E-02	5.538E-02	NOT IDENT.
AG-110	7.427E-01	1.443E+00	1.481E+00	NOT IDENT.
AG-110M	-2.180E-02	9.198E-02	9.250E-02	NOT IDENT.
SN-113	1.446E-02	8.844E-02	8.868E-02	NOT IDENT.
CD-115	8.780E+02	2.658E+04	2.659E+04	SHORT HLIF
SN-117M	7.591E-02	2.964E-01	2.984E-01	NOT IDENT.
SB-122	-4.249E+01	1.436E+03	1.436E+03	SHORT HLIF
TE-123M	1.947E-02	5.245E-02	5.318E-02	NOT IDENT.
SB-124	3.768E-02	2.378E-01	2.384E-01	NOT IDENT.
SB-125	-3.774E-02	1.882E-01	1.890E-01	FAIL ABUN
TE-125M	8.377E+00	1.919E+01	1.956E+01	NOT IDENT.
I-126	1.533E+00	1.456E+00	1.611E+00	NOT IDENT.
SB-126	2.075E-01	1.244E+00	1.247E+00	NOT IDENT.
SB-127	-7.547E+01	1.761E+02	1.794E+02	SHORT HLIF
I-131	1.350E+00	1.373E+00	1.502E+00	NOT IDENT.
I-132	1.000E+41	5.356E+41	0.000E+00	SHORT HLIF
TE-132	5.961E+01	1.873E+02	1.892E+02	SHORT HLIF
BA-133	4.669E-02	7.337E-02	7.633E-02	NOT IDENT.
I-133	-5.262E+11	1.404E+12	1.424E+12	SHORT HLIF
CS-134	1.073E-01	8.425E-02	9.716E-02	NOT IDENT.
I-135	-1.000E+41	3.296E+41	0.000E+00	SHORT HLIF
CS-136	6.093E-01	6.594E-01	7.143E-01	FAIL ABUN
BA-137M	-7.509E-02	6.400E-02	7.240E-02	NOT IDENT.
CS-137	-7.933E-02	6.761E-02	7.648E-02	NOT IDENT.
LA-138	2.176E-02	1.033E-01	1.038E-01	NOT IDENT.
CE-139	3.217E-02	5.265E-02	5.461E-02	NOT IDENT.
BA-140	1.639E+00	1.589E+00	1.752E+00	NOT IDENT.
LA-140	-4.743E-01	5.804E-01	6.185E-01	FAIL ABUN
CE-141	-3.694E-02	1.767E-01	1.775E-01	NOT IDENT.
CE-143	5.961E+07	3.677E+07	4.554E+07	SHORT HLIF
CE-144	-8.934E-02	2.994E-01	3.021E-01	NOT IDENT.
PM-144	5.419E-02	6.528E-02	6.970E-02	NOT IDENT.
PR-144	4.156E+00	4.954E+00	5.297E+00	NOT IDENT.
PM-146	6.342E-03	8.042E-02	8.048E-02	FAIL ABUN
ND-147	1.408E+00	3.980E+00	4.031E+00	FAIL ABUN
PM-147	7.706E+02	1.155E+03	1.206E+03	NOT IDENT.
PM-149	-1.715E+04	2.663E+05	2.664E+05	SHORT HLIF
EU-150	-3.156E-02	5.403E-02	5.587E-02	FAIL ABUN
EU-152	-2.512E-01	2.234E-01	2.504E-01	FAIL ABUN
GD-153	-4.464E-02	1.450E-01	1.463E-01	NOT IDENT.
EU-154	4.582E-02	2.207E-01	2.216E-01	NOT IDENT.
EU-155	8.663E-02	1.689E-01	1.733E-01	FAIL ABUN
TB-160	4.829E-02	2.997E-01	3.005E-01	FAIL ABUN
HO-166M	-3.765E-02	9.816E-02	9.961E-02	NOT IDENT.
TM-171	1.644E+01	5.778E+01	5.825E+01	NOT IDENT.
HF-172	-1.502E-01	3.239E-01	3.309E-01	FAIL ABUN

LU-172	5.423E-02	1.322E-01	1.344E-01	FAIL ABUN
LU-176	3.794E-02	4.327E-02	4.653E-02	FAIL ABUN
HF-181	-3.549E-02	1.131E-01	1.142E-01	NOT IDENT.
TA-182	-1.217E-02	4.702E-01	4.702E-01	FAIL ABUN
RE-183	-2.778E-01	7.084E-01	7.193E-01	NOT IDENT.
RE-184	1.141E-02	3.516E-01	3.516E-01	NOT IDENT.
W-188	-1.046E+01	1.724E+01	1.788E+01	NOT IDENT.
IR-192	-2.346E-02	8.189E-02	8.257E-02	FAIL ABUN
HG-203	8.020E-03	9.049E-02	9.056E-02	FAIL ABUN
TL-204	-2.835E+00	1.047E+01	1.055E+01	NOT IDENT.
BI-207	-8.085E-03	9.776E-02	9.783E-02	FAIL ABUN
BI-210	5.221E+00	1.552E+01	1.569E+01	NOT IDENT.
PB-210	5.221E+00	1.552E+01	1.569E+01	NOT IDENT.
PB-211	6.113E-01	1.274E+00	1.304E+00	NOT IDENT.
BI-213	1.327E-01	2.037E-01	2.123E-01	NOT IDENT.
BI-214	2.110E+00	3.804E-01	1.024E+00	FAIL ABUN
RN-219	2.123E-01	7.355E-01	7.417E-01	FAIL ABUN
RN-222	2.110E+00	3.804E-01	1.024E+00	FAIL ABUN
RA-223	1.278E+00	1.195E+00	1.327E+00	FAIL ABUN
AC-225	-1.389E+00	4.927E+00	4.967E+00	NOT IDENT.
AC-227	-2.560E-01	4.217E-01	4.372E-01	NOT IDENT.
TH-227	-2.560E-01	4.217E-01	4.372E-01	NOT IDENT.
PA-231	1.193E-01	8.541E-01	8.558E-01	NOT IDENT.
TH-231	1.278E+00	1.195E+00	1.327E+00	FAIL ABUN
PA-233	-5.444E-02	9.843E-02	1.014E-01	FAIL ABUN
PA-234	4.475E-02	5.616E-01	5.620E-01	FAIL ABUN
PA-234M	-4.376E+00	8.825E+00	9.042E+00	NOT IDENT.
TH-234	1.347E+00	3.225E+00	3.282E+00	FAIL ABUN
NP-237	-5.444E-02	9.843E-02	1.014E-01	FAIL ABUN
NP-238	-4.134E+02	7.420E+04	7.420E+04	SHORT HLIF
U-238	1.347E+00	3.225E+00	3.282E+00	FAIL ABUN
NP-239	-1.942E-01	4.207E-01	4.297E-01	FAIL ABUN
PU-239	4.346E+02	6.792E+02	7.069E+02	FAIL ABUN
AM-241	1.725E-01	4.063E-01	4.137E-01	NOT IDENT.
CM-243	-4.261E-02	1.773E-01	1.784E-01	FAIL ABUN
BK-247	-6.669E-02	1.475E-01	1.505E-01	NOT IDENT.
CM-247	3.468E-03	7.059E-02	7.061E-02	NOT IDENT.
CF-249	6.805E-04	7.241E-02	7.241E-02	NOT IDENT.
CF-251	1.959E-01	2.883E-01	3.015E-01	FAIL ABUN

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	54.3828	85.43	106.9368	131.20	49.1569
45.60	55.8578	86.55	92.9513	133.02	47.1314
46.54	48.7219	86.79	93.0272	133.52	46.0649
49.72	0.0000	86.94	93.0763	136.00	50.8619
51.35	46.6083	87.09	93.1239	136.47	58.8396
51.87	48.4330	87.57	61.0899	140.51	0.0000
52.39	43.4503	88.03	61.1855	143.76	63.2992
52.97	40.1606	88.34	61.2498	144.24	56.4559
53.44	46.2513	88.47	61.2767	145.44	65.8515
54.07	52.4119	89.96	54.3005	152.43	62.1854
57.36	0.0000	1093.63	54.4235	153.25	37.6128
57.53	60.2916	91.11	54.5082	323.87	53.0022
57.98	63.9221	92.59	54.7734	156.02	69.7618
59.27	57.2613	93.35	58.9267	158.56	51.1176
59.32	55.5122	94.56	60.5017	159.00	48.7845
59.54	55.5689	94.65	56.4845	162.33	41.9347
60.96	75.4629	94.67	56.4883	162.66	45.5599
61.17	74.6462	94.87	56.5242	163.33	52.8267
62.93	66.2797	97.43	48.8438	165.86	42.2381
63.29	54.7229	98.43	46.2741	176.31	48.0454
63.58	56.5893	98.44	46.2758	176.60	48.0722
64.28	76.5846	99.53	46.4318	177.52	51.0385
66.73	63.7360	100.11	49.2510	181.07	0.0000
67.24	72.0856	102.03	48.1631	181.52	58.0620
125.81	67.6480	103.18	60.0669	184.41	53.3724
67.75	64.0100	103.37	60.1010	143.76	53.5013
68.89	65.2327	105.21	47.9271	193.51	36.8801
69.67	60.2192	105.31	47.9411	197.03	49.4797
70.82	65.4391	106.12	50.1445	198.01	49.5647
70.83	65.4424	106.47	53.3330	201.83	43.3556
72.81	64.4059	109.28	43.2244	203.43	72.4575
72.87	64.4211	111.00	51.9111	205.31	59.7089
74.66	64.8733	111.76	0.0000	210.85	57.6446
74.82	64.9139	114.06	49.1501	215.65	44.8948
74.97	64.9512	116.30	0.0000	218.12	46.8419
77.11	65.4840	116.74	57.0456	222.11	46.2511
78.74	65.8846	119.76	50.9982	227.09	43.9242
79.69	62.6028	121.12	39.2028	227.38	43.0474
80.03	62.6801	121.22	42.4807	228.16	0.0000
80.12	62.7020	121.78	49.0883	228.18	41.3047
80.19	61.4380	122.06	54.5822	116.74	41.3047
80.57	61.5229	122.92	59.0806	235.69	40.8723
81.00	75.7408	123.07	49.2531	235.96	43.6147
81.07	75.7600	265.00	47.1385	238.63	67.0520
81.75	91.3931	125.81	54.3772	238.98	0.0000
82.47	82.2737	127.23	45.7228	240.99	82.3920
83.79	62.2383	127.91	50.9730	242.00	42.6326
84.00	62.2842	129.30	51.1499	244.70	44.1821

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	53.1717	563.25	15.1172
252.80	36.3181	345.93	25.0669	564.24	0.0000
254.15	0.0000	351.06	25.2051	569.33	12.1449
256.23	47.7230	351.93	25.2285	946.00	12.1465
260.90	0.0000	355.39	0.0000	569.70	12.1480
264.66	41.1813	356.01	20.5866	583.19	22.0321
264.80	41.1892	364.49	15.9766	584.27	22.0482
265.00	42.6210	366.42	0.0000	595.83	16.4236
269.46	41.9259	372.51	20.4032	427.87	20.3527
270.03	41.9572	375.05	25.8389	602.52	0.0000
271.23	42.0252	377.52	25.9028	604.72	21.7684
273.65	27.3084	356.01	32.5824	607.14	18.6885
276.40	43.2751	388.16	29.4483	609.32	16.5704
277.37	39.4785	388.63	27.2797	610.33	16.5813
277.60	33.7111	391.69	25.1722	614.28	23.4697
278.00	26.9832	264.66	18.7660	618.01	14.7038
279.20	38.6076	401.81	26.5220	620.36	19.6350
279.54	41.5215	402.40	30.9600	621.93	15.7236
279.70	41.5303	404.85	24.3816	630.19	0.0000
280.46	40.6038	410.95	25.6359	631.29	14.8293
283.69	34.9490	413.71	21.2316	633.25	14.8476
284.31	39.8347	414.70	24.6063	634.78	14.8618
285.41	43.7823	423.72	22.5541	635.95	14.8727
285.90	0.0000	427.09	24.8847	636.99	9.5250
287.50	34.1434	427.87	33.9575	657.50	16.0776
290.67	42.6053	433.94	27.3135	657.76	17.0851
293.27	0.0000	439.40	28.5884	657.90	0.0000
351.93	39.4002	440.45	24.0364	661.66	25.1846
295.96	39.4368	453.88	25.4738	664.57	0.0000
879.38	35.6074	463.37	30.6389	666.33	13.1333
299.98	43.1000	468.07	15.4671	666.50	13.1345
300.09	43.1053	473.00	0.0000	667.71	0.0000
300.13	43.1079	475.06	29.1681	677.62	12.2051
301.36	40.6914	476.78	20.3577	685.70	0.0000
302.85	40.7648	477.60	23.0285	692.65	0.0000
256.23	46.8241	482.18	25.7812	695.00	18.4955
304.85	46.8432	487.02	26.7737	696.49	13.3694
306.78	24.9746	492.35	0.0000	696.51	13.3698
308.46	34.0339	497.08	17.9919	697.00	9.2585
311.90	31.1577	505.52	17.3859	697.30	7.2023
316.51	43.4532	507.63	0.0000	697.49	7.2032
319.41	35.4885	511.00	22.7335	702.65	17.5453
320.08	28.4124	514.00	22.7859	706.68	20.6897
321.04	41.6506	514.00	22.7859	711.68	15.5612
323.87	24.4600	520.40	23.8124	720.70	22.2448
325.23	32.1537	520.69	0.0000	721.93	0.0000
328.76	38.9440	522.65	0.0000	722.78	20.0438
333.37	26.7839	527.90	0.0000	722.91	20.0449
333.97	40.2029	528.26	13.2662	723.31	18.3788
334.37	34.0333	529.59	14.7544	724.19	16.7163
338.28	38.3234	529.87	0.0000	727.33	17.7922
338.32	38.3256	531.02	11.8160	733.00	6.7193
311.90	45.1647	537.26	12.0562	735.93	8.4128
340.48	45.1647	546.56	0.0000	333.97	19.9973
340.55	45.1682	552.55	16.5032	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	19.0151	949.00	11.2061	1384.29	7.2992
747.24	11.6395	667.71	0.0000	1408.01	11.0288
748.06	11.6445	962.31	16.4366	1434.09	6.4842
752.31	18.0376	964.08	15.6661	1435.80	5.5608
753.82	12.7430	966.17	21.9519	1457.56	0.0000
756.73	7.4450	911.20	17.8969	1460.82	6.5357
756.80	5.3181	983.53	6.6346	1489.16	4.7070
884.68	16.0153	984.45	0.0000	1505.03	9.4572
765.81	20.3064	1274.44	11.1172	1584.12	8.7012
766.42	23.5200	1001.03	17.1861	1596.21	7.7598
766.84	20.3174	1002.74	8.5992	1620.50	4.8818
772.60	0.0000	1004.73	12.4316	1621.92	6.8371
776.52	17.1973	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	4.9725
778.90	10.7617	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	8.7236	1764.49	5.2100
788.74	15.1437	1038.76	0.0000	1063.66	5.2174
792.07	31.4232	631.29	6.8089	1771.35	6.9584
795.86	10.8566	1048.07	6.8130	1791.20	0.0000
810.06	12.2476	1049.04	12.6579	1808.65	6.1440
810.29	12.2490	1050.41	12.6642	1810.72	0.0000
344.28	12.2500	1063.66	12.7309	1836.06	3.0922
810.76	12.2521	1077.00	9.8447		
815.77	10.9671	1077.34	7.8766		
1048.07	12.0803	1085.87	11.8541		
832.01	13.2671	1093.63	11.8898		
834.85	23.2501	1099.45	15.8883		
835.71	22.1521	1112.07	11.0867		
836.80	0.0000	1112.84	8.7333		
846.75	0.0000	1115.54	21.6466		
846.77	12.2498	1120.29	11.0097		
856.80	21.2614	1120.55	11.0107		
860.56	8.9683	1221.41	11.0140		
871.09	11.7171	1129.67	10.0439		
873.19	14.4355	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	12.6680	1173.23	8.1645		
880.51	13.5798	1177.95	11.2449		
881.60	15.3984	1189.05	10.2637		
883.24	11.7844	1204.77	11.3529		
884.68	13.6066	1221.41	17.6475		
889.28	17.2716	1231.02	16.6641		
894.76	20.0498	1235.36	21.9044		
898.04	10.0399	1238.28	16.7063		
900.72	18.2769	1260.41	0.0000		
903.28	12.8088	1271.87	13.7287		
911.20	13.7736	1274.44	8.4559		
912.08	13.7791	1274.54	8.4559		
923.98	0.0000	1291.59	15.9448		
926.50	6.4721	1298.22	0.0000		
929.11	24.0671	1312.11	10.7012		
935.54	16.7098	1332.49	11.8492		
937.49	20.4402	1362.66	0.0000		
944.13	13.0457	1365.19	6.5303		
946.00	13.0563	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:15.94

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724006.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM02.CNF;562

		Background date	: 27-FEB-2023 04:48:05
Sample date	: 20-JAN-2023 11:30:00	Acquisition date	: 28-FEB-2023 05:20:47
Sample ID	: G609724006	Sample quantity	: 7.20500E+01 GRAM
Detector name	: GAM02	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:01.21 0.0%
Energy tolerance	: 1.50000 keV	Analyst Initials	: RXF2
Abundance limit	: 75.00000	Sensitivity	: 3.00000
Batch ID	: 2379916	Detector SN#	:
Matrix Spike ID	:	LCS ID	:

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	47.10*	33	168	1.83	94.96	91	8	9.19E-03	71.3	
2	0	63.06*	34	176	0.93	126.91	124	8	9.46E-03	73.2	
3	1	75.00*	195	207	1.11	150.78	144	19	5.42E-02	14.6	3.37E+00
4	1	77.09	320	164	1.00	154.98	144	19	8.88E-02	8.6	
5	1	79.20	40	181	1.22	159.20	144	19	1.11E-02	61.5	
6	2	87.34*	104	177	1.37	175.47	165	30	2.90E-02	24.2	3.47E+00
7	2	89.86*	99	160	1.37	180.52	165	30	2.74E-02	25.5	
8	2	92.69*	130	118	1.20	186.18	165	30	3.60E-02	19.5	
9	2	94.38	36	124	1.39	189.56	165	30	9.94E-03	74.9	
10	0	98.58*	11	146	1.35	197.97	195	8	2.99E-03	200.3	
11	0	143.78*	28	146	0.92	288.40	286	9	7.66E-03	82.8	
12	0	164.21*	46	131	3.90	329.27	325	11	1.27E-02	51.8	
13	0	185.93*	166	130	1.32	372.72	368	10	4.62E-02	16.0	
14	0	209.37	15	165	1.11	419.62	415	9	4.22E-03	154.9	
15	2	238.72*	466	76	1.28	478.33	472	17	1.30E-01	5.7	3.11E+00
16	2	241.90	197	82	1.38	484.70	472	17	5.48E-02	10.6	
17	0	270.17	40	102	1.27	541.24	537	10	1.11E-02	50.1	
18	0	290.89	28	81	0.61	582.68	577	11	7.79E-03	65.4	
19	4	295.45*	373	52	1.63	591.81	587	20	1.04E-01	6.1	6.12E+00
20	4	299.78	56	56	2.09	600.48	587	20	1.55E-02	34.4	
21	0	329.48	82	95	1.77	659.88	651	19	2.28E-02	30.6	
22	0	338.52	112	85	1.21	677.97	671	13	3.12E-02	19.3	
23	0	352.13*	504	104	1.17	705.20	700	12	1.40E-01	6.0	
24	0	463.53	40	57	1.40	928.01	922	14	1.10E-02	43.2	
25	0	511.70*	22	69	1.19	1024.35	1017	13	6.03E-03	94.3	
26	0	583.50*	126	51	1.50	1167.93	1161	12	3.50E-02	14.6	
27	0	609.47*	369	55	1.58	1219.87	1212	14	1.02E-01	6.8	
28	0	688.41	13	17	0.59	1377.72	1371	10	3.51E-03	67.9	
29	0	712.39	14	13	1.29	1425.68	1422	7	3.89E-03	51.3	
30	0	727.73	42	19	1.78	1456.35	1452	11	1.17E-02	26.2	
31	0	768.15*	44	25	1.15	1537.17	1532	12	1.22E-02	27.7	
32	0	786.67	13	19	0.50	1574.20	1568	9	3.57E-03	68.6	
33	0	795.42	23	28	0.54	1591.70	1587	14	6.39E-03	53.1	
34	0	805.72	24	19	2.73	1612.29	1607	11	6.66E-03	40.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	854.45	19	10	3.71	1709.73	1704	11	5.18E-03	41.3	
36	0	860.54	25	6	2.29	1721.91	1718	8	6.90E-03	26.4	
37	0	911.20*	108	11	1.39	1823.19	1817	14	2.99E-02	11.9	
38	0	934.56*	15	17	2.13	1869.89	1865	10	4.30E-03	57.8	
39	5	964.69	30	15	2.70	1930.13	1925	19	8.30E-03	29.7	3.83E+00
40	5	969.01	54	17	1.91	1938.76	1925	19	1.50E-02	20.4	
41	0	1120.47*	85	23	1.39	2241.52	2234	13	2.35E-02	16.2	
42	0	1170.50	24	7	1.36	2341.52	2334	14	6.67E-03	31.0	
43	0	1237.98	20	15	2.43	2476.41	2471	9	5.50E-03	42.4	
44	0	1461.10*	107	14	1.32	2922.30	2916	14	2.98E-02	12.6	
45	0	1510.30	12	2	1.03	3020.62	3014	11	3.26E-03	39.5	
46	0	1685.17	9	0	0.50	3370.00	3365	11	2.50E-03	33.3	
47	0	1764.62*	62	0	2.40	3528.73	3521	15	1.71E-02	13.9	
48	0	1821.10	9	0	1.87	3641.56	3637	9	2.50E-03	33.3	
49	0	1848.14*	4	6	3.35	3695.58	3687	13	1.22E-03	131.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:21:17

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724006.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 20-JAN-2023 11:30:00	Acquisition date	: 28-FEB-2023 05:20:47
Sample ID	: G609724006	Sample quantity	: 72.050 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA2	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:01.21 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	99	10.66*	1.001E+00	9.627E+00	9.627E+00	25.30
CD-109	88.03	85	3.70*	4.815E+00	4.994E+00	5.294E+00	48.36
SN-126	64.28	28	9.60	2.267E+00	1.317E+00	1.317E+00	146.31
	86.94	85	8.90	4.815E+00	2.076E+00	2.076E+00	48.36
	87.57	85	37.00*	4.815E+00	4.994E-01	4.994E-01	48.36
TL-208	277.37	------	6.60	3.910E+00	------ Line Not Found		------
	583.19	112	85.00*	2.224E+00	6.155E-01	6.155E-01	29.24
	860.56	22	12.50	1.597E+00	1.166E+00	1.166E+00	52.77
BI-210	46.54	26	4.25*	5.217E-01	1.241E+01	1.245E+01	142.54
PB-210	46.54	26	4.25*	5.217E-01	1.241E+01	1.245E+01	142.54
BI-211	72.87	------	1.23	3.466E+00	------ Line Not Found		------
	351.06	437	12.92*	3.279E+00	1.075E+01	1.075E+01	12.09
BI-212	727.33	38	6.67*	1.851E+00	3.170E+00	3.170E+00	52.41
	1620.50	------	1.47	9.280E-01	------ Line Not Found		------
PB-212	74.82	159	10.28	3.702E+00	4.350E+00	4.350E+00	29.16
	77.11	260	17.10	3.924E+00	4.044E+00	4.044E+00	17.10
	238.63	398	43.60*	4.355E+00	2.186E+00	2.186E+00	11.44
	300.09	48	3.30	3.694E+00	4.118E+00	4.118E+00	68.88
BI-214	609.32	327	45.49*	2.147E+00	3.487E+00	3.488E+00	13.68
	1120.29	77	14.92	1.257E+00	4.277E+00	4.277E+00	32.44
	1764.49	57	15.30	8.813E-01	4.393E+00	4.393E+00	27.71
PB-214	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.613E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
RN-222	609.32	327	45.49*	2.147E+00	3.487E+00	3.488E+00	13.68
	1120.29	77	14.92	1.257E+00	4.277E+00	4.277E+00	32.44
	1764.49	57	15.30	8.813E-01	4.393E+00	4.393E+00	27.71
RA-224	240.99	168	4.10*	4.314E+00	9.924E+00	9.924E+00	21.23
RA-226	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.613E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
AC-228	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89
RA-228	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89
TH-228	74.82	159	10.28	3.702E+00	4.350E+00	4.350E+00	29.16
	77.11	260	17.10	3.924E+00	4.044E+00	4.044E+00	17.10

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	398	43.60*	4.355E+00	2.186E+00	2.186E+00	11.44
	300.09	48	3.30	3.694E+00	4.118E+00	4.118E+00	68.88
TH-230	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.612E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
TH-232	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89
TH-234	63.29	28	3.70*	2.267E+00	3.418E+00	3.418E+00	146.31
	92.59	107	4.23	5.156E+00	5.091E+00	5.091E+00	39.00
U-234	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.612E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
U-235	89.96	81	3.47	4.986E+00	4.874E+00	4.874E+00	50.98
	93.35	107	5.60	5.156E+00	3.845E+00	3.845E+00	39.00
	143.76	23	10.96*	5.769E+00	3.802E-01	3.802E-01	165.62
	163.33	38	5.08	5.481E+00	1.435E+00	1.435E+00	103.56
	185.72	141	57.20	5.130E+00	4.995E-01	4.995E-01	31.92
	205.31	------	5.01	4.824E+00	------ Line Not Found		------
U-238	63.29	28	3.70*	2.267E+00	3.418E+00	3.418E+00	146.31
	92.59	107	4.23	5.156E+00	5.091E+00	5.091E+00	39.00
AM-243	43.53	------	5.90	2.935E-01	------ Line Not Found		------
	74.66	159	67.20*	3.702E+00	6.655E-01	6.655E-01	29.16
ANH-511	511.00	19	100.00*	2.469E+00	8.076E-02	8.076E-02	188.65

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:18.32

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724006.CNF;1		
Acquisition date	28-FEB-2023 05:20:47	Sensitivity	3.000
Detector ID	GAM02	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:01.21	Half life ratio	*****
Sample date	20-JAN-2023 11:30:00	Analyst initials	RXF2
Sample ID	G609724006	Sample Quantity	7.2050E+01 GRAM
Batch Number	2379916	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	23-SEP-2022 06:33:35	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	9.627E+00	2.387E+00	1.817E+00
CD-109	5.294E+00	2.509E+00	3.086E+00
SN-126	4.994E-01	2.367E-01	2.930E-01
TL-208	6.155E-01	1.764E-01	1.543E-01
BI-210	1.245E+01	1.740E+01	2.325E+01
PB-210	1.245E+01	1.740E+01	2.325E+01
BI-211	1.075E+01	1.274E+00	7.669E-01
BI-212	3.170E+00	1.628E+00	1.996E+00
PB-212	2.186E+00	2.451E-01	2.141E-01
BI-214	3.488E+00	4.676E-01	2.802E-01
PB-214	3.902E+00	4.624E-01	2.789E-01
RN-222	3.488E+00	4.676E-01	2.802E-01
RA-224	9.924E+00	2.065E+00	2.295E+00
RA-226	3.902E+00	4.624E-01	2.789E-01
AC-228	2.585E+00	6.027E-01	5.287E-01
RA-228	2.585E+00	6.027E-01	5.287E-01
TH-228	2.186E+00	2.451E-01	2.141E-01
TH-230	3.902E+00	4.624E-01	2.789E-01
TH-232	2.585E+00	6.027E-01	5.287E-01
TH-234	3.418E+00	4.901E+00	5.703E+00
U-234	3.902E+00	4.624E-01	2.789E-01
U-235	3.802E-01	6.172E-01	7.233E-01
U-238	3.418E+00	4.901E+00	5.703E+00
AM-243	6.655E-01	1.902E-01	2.339E-01
ANH-511	8.076E-02	1.493E-01	1.233E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	5.258E-01	1.105E+00	2.033E+00	NOT IDENT.
NA-22	-2.192E-02	9.169E-02	1.664E-01	NOT IDENT.
NA-24	0.000E+00	3.321E+17	0.000E+00	SHORT HLIF
AL-26	-2.268E-03	7.086E-02	1.494E-01	NOT IDENT.
SC-46	5.685E-02	1.192E-01	2.354E-01	FAIL ABUN

V-48	-1.693E-01	3.862E-01	6.859E-01	NOT IDENT.
CR-51	1.371E-01	1.460E+00	2.614E+00	NOT IDENT.
MN-52	-6.118E+00	9.816E+00	1.620E+01	FAIL ABUN
MN-54	-3.831E-02	8.522E-02	1.508E-01	NOT IDENT.
CO-56	7.663E-03	1.060E-01	2.026E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	9.786E-03	5.590E-02	9.280E-02	NOT IDENT.
CO-58	8.496E-02	1.108E-01	2.139E-01	NOT IDENT.
FE-59	-2.869E-02	2.795E-01	5.221E-01	NOT IDENT.
CO-60	-1.539E-02	8.741E-02	1.615E-01	NOT IDENT.
ZN-65	3.350E-02	2.142E-01	3.681E-01	NOT IDENT.
GE-68	-1.594E+00	2.176E+00	3.590E+00	NOT IDENT.
AS-73	2.609E+00	3.381E+00	5.896E+00	NOT IDENT.
AS-74	-2.132E-01	5.410E-01	9.009E-01	NOT IDENT.
SE-75	2.747E-02	1.099E-01	1.993E-01	NOT IDENT.
BR-77	0.000E+00	3.760E+04	0.000E+00	SHORT HLIF
SR-82	-7.481E-01	1.225E+00	2.137E+00	NOT IDENT.
RB-83	-7.511E-04	1.881E-01	3.337E-01	NOT IDENT.
RB-84	6.179E-02	2.709E-01	5.230E-01	NOT IDENT.
KR-85	7.164E+00	1.770E+01	2.945E+01	NOT IDENT.
SR-85	4.836E-02	1.203E-01	2.000E-01	NOT IDENT.
RB-86	-2.008E+00	3.166E+00	5.376E+00	NOT IDENT.
Y-88	3.183E-02	1.191E-01	2.533E-01	NOT IDENT.
Y-91	2.594E+01	5.813E+01	1.165E+02	NOT IDENT.
NB-94	5.838E-02	7.898E-02	1.585E-01	NOT IDENT.
NB-95	1.702E-01	1.270E-01	2.615E-01	NOT IDENT.
NB-95M	-8.097E-02	3.613E-01	5.627E-01	NOT IDENT.
ZR-95	2.645E-02	1.920E-01	3.714E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.048E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.062E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-8.577E-02	7.583E-02	1.116E-01	NOT IDENT.
RH-102	1.279E-01	1.211E-01	2.457E-01	FAIL ABUN
RU-103	-3.502E-02	1.306E-01	2.222E-01	FAIL ABUN
RH-106	-3.210E-01	7.954E-01	1.318E+00	NOT IDENT.
RU-106	-3.210E-01	7.954E-01	1.318E+00	NOT IDENT.
AG-108M	6.284E-02	6.122E-02	1.221E-01	NOT IDENT.
AG-110	-7.503E-01	1.571E+00	2.582E+00	NOT IDENT.
AG-110M	-3.102E-02	1.453E-01	2.617E-01	NOT IDENT.
SN-113	-1.350E-01	1.315E-01	2.074E-01	NOT IDENT.
CD-115	0.000E+00	3.883E+04	0.000E+00	SHORT HLIF
SN-117M	1.126E-01	4.024E-01	7.274E-01	NOT IDENT.
SB-122	0.000E+00	1.673E+03	0.000E+00	SHORT HLIF
TE-123M	7.703E-03	7.010E-02	1.257E-01	NOT IDENT.
SB-124	9.294E-02	1.879E-01	4.479E-01	NOT IDENT.
SB-125	-4.625E-02	2.176E-01	3.750E-01	FAIL ABUN
TE-125M	3.773E+00	2.944E+01	4.845E+01	NOT IDENT.
I-126	1.423E+00	1.786E+00	3.475E+00	NOT IDENT.
SB-126	6.337E-01	1.213E+00	2.414E+00	NOT IDENT.
SB-127	0.000E+00	1.869E+02	0.000E+00	SHORT HLIF
I-131	1.293E+00	2.171E+00	4.028E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	2.761E+02	0.000E+00	SHORT HLIF
BA-133	-1.525E-02	1.095E-01	1.699E-01	NOT IDENT.
I-133	0.000E+00	1.990E+12	0.000E+00	SHORT HLIF
CS-134	1.520E-01	1.581E-01	2.210E-01	FAIL ABUN
I-135	0.000E+00	1.581E+41	0.000E+00	SHORT HLIF
CS-136	-5.259E-01	7.342E-01	1.223E+00	NOT IDENT.
BA-137M	3.237E-02	7.024E-02	1.346E-01	NOT IDENT.
CS-137	3.420E-02	7.421E-02	1.422E-01	NOT IDENT.
LA-138	-2.827E-02	1.256E-01	2.313E-01	NOT IDENT.
CE-139	-9.670E-03	6.938E-02	1.227E-01	NOT IDENT.
BA-140	-1.373E+00	2.288E+00	3.718E+00	NOT IDENT.
LA-140	-5.461E-01	6.892E-01	1.167E+00	FAIL ABUN
CE-141	2.817E-02	2.353E-01	3.836E-01	NOT IDENT.
CE-143	0.000E+00	4.342E+07	0.000E+00	SHORT HLIF
CE-144	-2.132E-02	4.717E-01	7.621E-01	FAIL ABUN
PM-144	-5.870E-02	7.279E-02	1.237E-01	NOT IDENT.
PR-144	-4.483E+00	5.510E+00	9.352E+00	NOT IDENT.
PM-146	9.208E-02	9.793E-02	1.904E-01	NOT IDENT.
ND-147	1.525E+00	5.185E+00	9.633E+00	FAIL ABUN
PM-147	8.921E+02	1.611E+03	2.751E+03	NOT IDENT.
PM-149	0.000E+00	3.668E+05	0.000E+00	SHORT HLIF
EU-150	5.009E-03	7.392E-02	9.523E-02	FAIL ABUN
EU-152	9.227E-02	2.377E-01	4.319E-01	FAIL ABUN
GD-153	6.537E-02	2.567E-01	3.091E-01	FAIL ABUN
EU-154	-7.209E-02	2.545E-01	4.582E-01	NOT IDENT.

EU-155	1.208E-01	2.470E-01	4.173E-01	FAIL ABUN
TB-160	1.219E-02	3.636E-01	6.923E-01	FAIL ABUN
HO-166M	1.276E-01	1.282E-01	2.784E-01	FAIL ABUN
TM-171	-5.543E+01	6.270E+01	9.688E+01	NOT IDENT.
HF-172	5.842E-01	4.102E-01	7.459E-01	FAIL ABUN
LU-172	8.598E-03	1.201E-01	2.354E-01	FAIL ABUN
LU-176	-3.576E-02	5.446E-02	9.087E-02	FAIL ABUN
HF-181	4.120E-02	1.429E-01	2.623E-01	NOT IDENT.
TA-182	5.230E-01	3.957E-01	9.162E-01	FAIL ABUN
RE-183	1.695E-02	7.928E-01	1.311E+00	NOT IDENT.
RE-184	7.250E-02	4.796E-01	9.141E-01	NOT IDENT.
W-188	2.435E+01	3.120E+01	4.002E+01	FAIL ABUN
IR-192	3.516E-02	9.713E-02	1.777E-01	FAIL ABUN
HG-203	4.039E-02	1.327E-01	2.386E-01	NOT IDENT.
TL-204	2.815E-01	1.473E+01	2.224E+01	FAIL ABUN
BI-207	1.499E-02	1.009E-01	1.987E-01	FAIL ABUN
PB-211	3.198E-01	1.636E+00	2.946E+00	NOT IDENT.
BI-213	1.379E-01	2.329E-01	4.395E-01	NOT IDENT.
RN-219	-2.848E-01	1.009E+00	1.721E+00	FAIL ABUN
RA-223	-6.699E-01	1.531E+00	2.298E+00	FAIL ABUN
AC-225	-9.476E+00	6.880E+00	1.071E+01	NOT IDENT.
AC-227	7.281E-02	5.588E-01	1.001E+00	FAIL ABUN
TH-227	7.281E-02	5.588E-01	1.001E+00	FAIL ABUN
TH-229	1.572E+00	1.151E+00	2.213E+00	FAIL ABUN
PA-231	1.198E+00	1.153E+00	2.041E+00	NOT IDENT.
TH-231	-6.699E-01	1.531E+00	2.298E+00	FAIL ABUN
PA-233	7.567E-02	1.352E-01	2.533E-01	FAIL ABUN
PA-234	-1.392E-01	6.932E-01	1.266E+00	FAIL ABUN
PA-234M	-5.532E+00	1.064E+01	1.816E+01	NOT IDENT.
NP-237	7.567E-02	1.352E-01	2.533E-01	FAIL ABUN
NP-238	0.000E+00	8.817E+04	0.000E+00	SHORT HLIF
NP-239	-3.994E-01	6.161E-01	9.498E-01	FAIL ABUN
PU-239	1.490E+02	7.961E+02	1.304E+03	NOT IDENT.
AM-241	7.723E-02	5.176E-01	7.970E-01	NOT IDENT.
CM-243	-9.812E-02	2.604E-01	4.119E-01	FAIL ABUN
BK-247	2.816E-02	1.851E-01	3.181E-01	NOT IDENT.
CM-247	1.313E-02	9.042E-02	1.611E-01	NOT IDENT.
CF-249	1.433E-01	9.785E-02	1.943E-01	NOT IDENT.
CF-251	2.037E-02	2.647E-01	4.747E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:16.71

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	99	10.66*	1.001E+00	9.627E+00	9.627E+00	25.30
CD-109	88.03	85	3.70*	4.815E+00	4.994E+00	5.294E+00	48.36
SN-126	64.28	28	9.60	2.267E+00	1.317E+00	1.317E+00	146.31
	86.94	85	8.90	4.815E+00	2.076E+00	2.076E+00	48.36
	87.57	85	37.00*	4.815E+00	4.994E-01	4.994E-01	48.36
TL-208	277.37	------	6.60	3.910E+00	------ Line Not Found		------
	583.19	112	85.00*	2.224E+00	6.155E-01	6.155E-01	29.24
	860.56	22	12.50	1.597E+00	1.166E+00	1.166E+00	52.77
BI-210	46.54	26	4.25*	5.217E-01	1.241E+01	1.245E+01	142.54
PB-210	46.54	26	4.25*	5.217E-01	1.241E+01	1.245E+01	142.54
BI-211	72.87	------	1.23	3.466E+00	------ Line Not Found		------
	351.06	437	12.92*	3.279E+00	1.075E+01	1.075E+01	12.09
BI-212	727.33	38	6.67*	1.851E+00	3.170E+00	3.170E+00	52.41
	1620.50	------	1.47	9.280E-01	------ Line Not Found		------
PB-212	74.82	159	10.28	3.702E+00	4.350E+00	4.350E+00	29.16
	77.11	260	17.10	3.924E+00	4.044E+00	4.044E+00	17.10
	238.63	398	43.60*	4.355E+00	2.186E+00	2.186E+00	11.44
	300.09	48	3.30	3.694E+00	4.118E+00	4.118E+00	68.88
BI-214	609.32	327	45.49*	2.147E+00	3.487E+00	3.488E+00	13.68
	1120.29	77	14.92	1.257E+00	4.277E+00	4.277E+00	32.44
	1764.49	57	15.30	8.813E-01	4.393E+00	4.393E+00	27.71
PB-214	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.613E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
RN-222	609.32	327	45.49*	2.147E+00	3.487E+00	3.488E+00	13.68
	1120.29	77	14.92	1.257E+00	4.277E+00	4.277E+00	32.44
	1764.49	57	15.30	8.813E-01	4.393E+00	4.393E+00	27.71
RA-224	240.99	168	4.10*	4.314E+00	9.924E+00	9.924E+00	21.23
RA-226	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.613E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
AC-228	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89
RA-228	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	159	10.28	3.702E+00	4.350E+00	4.350E+00	29.16
	77.11	260	17.10	3.924E+00	4.044E+00	4.044E+00	17.10
	238.63	398	43.60*	4.355E+00	2.186E+00	2.186E+00	11.44
	300.09	48	3.30	3.694E+00	4.118E+00	4.118E+00	68.88
TH-230	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.612E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
TH-232	105.21	------	1.10	5.666E+00	------ Line Not Found		------
	338.32	97	11.27	3.376E+00	2.668E+00	2.668E+00	38.62
	835.71	------	1.61	1.640E+00	------ Line Not Found		------
	911.20	97	25.80*	1.517E+00	2.585E+00	2.585E+00	23.79
	968.97	49	15.80	1.435E+00	2.237E+00	2.237E+00	40.89
TH-234	63.29	28	3.70*	2.267E+00	3.418E+00	3.418E+00	146.31
	92.59	107	4.23	5.156E+00	5.091E+00	5.091E+00	39.00
U-234	74.82	159	5.80	3.702E+00	7.711E+00	7.711E+00	29.16
	77.11	260	9.70	3.924E+00	7.130E+00	7.130E+00	17.10
	87.09	85	3.41	4.815E+00	5.419E+00	5.419E+00	48.36
	242.00	168	7.25	4.314E+00	5.612E+00	5.612E+00	21.23
	295.22	322	18.42	3.733E+00	4.873E+00	4.873E+00	12.20
	351.93	437	35.60*	3.279E+00	3.902E+00	3.902E+00	12.09
U-235	89.96	81	3.47	4.986E+00	4.874E+00	4.874E+00	50.98
	93.35	107	5.60	5.156E+00	3.845E+00	3.845E+00	39.00
	143.76	23	10.96*	5.769E+00	3.802E-01	3.802E-01	165.62
	163.33	38	5.08	5.481E+00	1.435E+00	1.435E+00	103.56
	185.72	141	57.20	5.130E+00	4.995E-01	4.995E-01	31.92
	205.31	------	5.01	4.824E+00	------ Line Not Found		------
U-238	63.29	28	3.70*	2.267E+00	3.418E+00	3.418E+00	146.31
	92.59	107	4.23	5.156E+00	5.091E+00	5.091E+00	39.00
AM-243	43.53	------	5.90	2.935E-01	------ Line Not Found		------
	74.66	159	67.20*	3.702E+00	6.655E-01	6.655E-01	29.16
ANH-511	511.00	19	100.00*	2.469E+00	8.076E-02	8.076E-02	188.65

Flag: "*" = Keyline

Sample ID : G609724006 Acquisition date : 28-FEB-2023 05:20:47

Total number of lines in spectrum 49
Number of unidentified lines 9
Number of lines tentatively identified by NID 40 81.63%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	9.627E+00	9.627E+00	2.435E+00	25.30	
CD-109	461.40D	1.06	4.994E+00	5.294E+00	2.560E+00	48.36	
SN-126	2.30E+05Y	1.00	4.994E-01	4.994E-01	2.415E-01	48.36	
TL-208	1.41E+10Y	1.00	6.155E-01	6.155E-01	1.800E-01	29.24	
BI-210	22.20Y	1.00	1.241E+01	1.245E+01	1.775E+01	142.54	
PB-210	22.20Y	1.00	1.241E+01	1.245E+01	1.775E+01	142.54	
BI-211	7.04E+08Y	1.00	1.075E+01	1.075E+01	0.130E+01	12.09	
BI-212	1.41E+10Y	1.00	3.170E+00	3.170E+00	1.662E+00	52.41	
PB-212	1.41E+10Y	1.00	2.186E+00	2.186E+00	0.250E+00	11.44	
BI-214	1600.00Y	1.00	3.487E+00	3.488E+00	0.477E+00	13.68	
PB-214	1600.00Y	1.00	3.902E+00	3.902E+00	0.472E+00	12.09	
RN-222	1600.00Y	1.00	3.487E+00	3.488E+00	0.477E+00	13.68	
RA-224	1.41E+10Y	1.00	9.924E+00	9.924E+00	2.107E+00	21.23	
RA-226	1600.00Y	1.00	3.902E+00	3.902E+00	0.472E+00	12.09	
AC-228	1.41E+10Y	1.00	2.585E+00	2.585E+00	0.615E+00	23.79	
RA-228	1.41E+10Y	1.00	2.585E+00	2.585E+00	0.615E+00	23.79	
TH-228	1.41E+10Y	1.00	2.186E+00	2.186E+00	0.250E+00	11.44	
TH-230	7.54E+04Y	1.00	3.902E+00	3.902E+00	0.472E+00	12.09	
TH-232	1.41E+10Y	1.00	2.585E+00	2.585E+00	0.615E+00	23.79	
TH-234	4.47E+09Y	1.00	3.418E+00	3.418E+00	5.001E+00	146.31	
U-234	2.45E+05Y	1.00	3.902E+00	3.902E+00	0.472E+00	12.09	
U-235	7.04E+08Y	1.00	3.802E-01	3.802E-01	6.298E-01	165.62	
U-238	4.47E+09Y	1.00	3.418E+00	3.418E+00	5.001E+00	146.31	
AM-243	7370.00Y	1.00	6.655E-01	6.655E-01	1.941E-01	29.16	
ANH-511	1.00E+09Y	1.00	8.076E-02	8.076E-02	15.23E-02	188.65	
			---	---			
	Total Activity :		1.071E+02	1.075E+02			

Grand Total Activity : 1.071E+02 1.075E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	79.20	33	148	1.22	159.20	144	19	1.11E-02	****	4.13E+00	T
2	94.38	29	102	1.39	189.56	165	30	9.94E-03	****	5.25E+00	T
0	98.58	9	120	1.35	197.97	195	8	2.99E-03	****	5.44E+00	T
0	209.37	13	140	1.11	419.62	415	9	4.22E-03	****	4.76E+00	T
0	270.17	34	88	1.27	541.24	537	10	1.11E-02	****	3.99E+00	T
0	290.89	24	70	0.61	582.68	577	11	7.79E-03	****	3.78E+00	T
0	329.48	71	82	1.77	659.88	651	19	2.28E-02	61.1	3.44E+00	T
0	463.53	35	50	1.40	928.01	922	14	1.10E-02	86.4	2.66E+00	T
0	688.41	11	15	0.59	1377.72	1371	10	3.51E-03	****	1.94E+00	
0	712.39	12	12	1.29	1425.68	1422	7	3.89E-03	****	1.88E+00	T
0	768.15	39	22	1.15	1537.17	1532	12	1.22E-02	55.4	1.77E+00	T
0	786.67	12	17	0.50	1574.20	1568	9	3.57E-03	****	1.73E+00	
0	795.42	21	25	0.54	1591.70	1587	14	6.39E-03	****	1.71E+00	T
0	805.72	22	17	2.73	1612.29	1607	11	6.66E-03	81.7	1.69E+00	
0	854.45	17	9	3.71	1709.73	1704	11	5.18E-03	82.6	1.61E+00	
0	934.56	14	15	2.13	1869.89	1865	10	4.30E-03	****	1.48E+00	T
5	964.69	27	14	2.70	1930.13	1925	19	8.30E-03	59.3	1.44E+00	T
0	1170.50	22	6	1.36	2341.52	2334	14	6.67E-03	62.1	1.21E+00	
0	1237.98	18	14	2.43	2476.41	2471	9	5.50E-03	84.8	1.15E+00	T
0	1510.30	11	2	1.03	3020.62	3014	11	3.26E-03	79.0	9.75E-01	
0	1685.17	8	0	0.50	3370.00	3365	11	2.50E-03	66.7	9.05E-01	
0	1821.10	8	0	1.87	3641.56	3637	9	2.50E-03	66.7	8.67E-01	
0	1848.14	4	6	3.35	3695.58	3687	13	1.22E-03	****	8.61E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:27.70

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724006.CNF;1		
Acquisition date	: 28-FEB-2023 05:20:47	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.21	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Nuclide Library	: SOLID
Sample ID	: G609724006	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 7.2050E+01 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-SEP-2022 06:33:35	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;17		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	7.790E-01
CD-109	1.465E+00
SN-126	1.391E-01
TL-208	6.991E-02
BI-210	1.097E+01
PB-210	1.097E+01
BI-211	3.515E-01
BI-212	8.872E-01
PB-212	9.995E-02
BI-214	1.261E-01
PB-214	1.278E-01
RN-222	1.261E-01
RA-224	1.072E+00
RA-226	1.278E-01
AC-228	2.292E-01
RA-228	2.292E-01
TH-228	9.995E-02
TH-230	1.278E-01
TH-232	2.292E-01
TH-234	2.695E+00
U-234	1.278E-01
U-235	3.405E-01
U-238	2.695E+00
AM-243	1.116E-01
ANH-511	5.613E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	9.334E-01	NOT IDENT.
NA-22	7.053E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	5.873E-02	NOT IDENT.
SC-46	1.055E-01	FAIL ABUN
V-48	2.906E-01	NOT IDENT.

CR-51	1.204E+00	NOT IDENT.
MN-52	6.432E+00	FAIL ABUN
MN-54	6.626E-02	NOT IDENT.
CO-56	8.931E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	4.348E-02	NOT IDENT.
CO-58	9.497E-02	NOT IDENT.
FE-59	2.261E-01	NOT IDENT.
CO-60	6.777E-02	NOT IDENT.
ZN-65	1.600E-01	NOT IDENT.
GE-68	1.432E+00	NOT IDENT.
AS-73	2.786E+00	NOT IDENT.
AS-74	4.024E-01	NOT IDENT.
SE-75	9.258E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	9.184E-01	NOT IDENT.
RB-83	1.499E-01	NOT IDENT.
RB-84	2.326E-01	NOT IDENT.
KR-85	1.344E+01	NOT IDENT.
SR-85	9.126E-02	NOT IDENT.
RB-86	2.170E+00	NOT IDENT.
Y-88	1.058E-01	NOT IDENT.
Y-91	5.112E+01	NOT IDENT.
NB-94	7.208E-02	NOT IDENT.
NB-95	1.190E-01	NOT IDENT.
NB-95M	2.625E-01	NOT IDENT.
ZR-95	1.642E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	5.237E-02	NOT IDENT.
RH-102	1.109E-01	FAIL ABUN
RU-103	9.932E-02	FAIL ABUN
RH-106	5.890E-01	NOT IDENT.
RU-106	5.890E-01	NOT IDENT.
AG-108M	5.568E-02	NOT IDENT.
AG-110	1.123E+00	NOT IDENT.
AG-110M	1.174E-01	NOT IDENT.
SN-113	9.499E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	3.436E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	5.926E-02	NOT IDENT.
SB-124	1.735E-01	NOT IDENT.
SB-125	1.709E-01	FAIL ABUN
TE-125M	2.286E+01	NOT IDENT.
I-126	1.571E+00	NOT IDENT.
SB-126	1.087E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.866E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	7.820E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	1.008E-01	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	5.119E-01	NOT IDENT.
BA-137M	5.971E-02	NOT IDENT.
CS-137	6.308E-02	NOT IDENT.
LA-138	9.483E-02	NOT IDENT.
CE-139	5.761E-02	NOT IDENT.
BA-140	1.665E+00	NOT IDENT.
LA-140	4.561E-01	FAIL ABUN
CE-141	1.808E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.584E-01	FAIL ABUN
PM-144	5.413E-02	NOT IDENT.
PR-144	4.091E+00	NOT IDENT.
PM-146	8.736E-02	NOT IDENT.
ND-147	4.314E+00	FAIL ABUN
PM-147	1.294E+03	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	4.346E-02	FAIL ABUN
EU-152	2.006E-01	FAIL ABUN
GD-153	1.450E-01	FAIL ABUN
EU-154	1.936E-01	NOT IDENT.
EU-155	1.973E-01	FAIL ABUN

TB-160	3.039E-01	FAIL ABUN
HO-166M	1.258E-01	FAIL ABUN
TM-171	4.550E+01	NOT IDENT.
HF-172	3.521E-01	FAIL ABUN
LU-172	9.999E-02	FAIL ABUN
LU-176	4.145E-02	FAIL ABUN
HF-181	1.188E-01	NOT IDENT.
TA-182	4.026E-01	FAIL ABUN
RE-183	6.208E-01	NOT IDENT.
RE-184	4.067E-01	NOT IDENT.
W-188	1.870E+01	FAIL ABUN
IR-192	8.219E-02	FAIL ABUN
HG-203	1.117E-01	NOT IDENT.
TL-204	1.059E+01	FAIL ABUN
BI-207	8.530E-02	FAIL ABUN
PB-211	1.351E+00	NOT IDENT.
BI-213	2.008E-01	NOT IDENT.
RN-219	7.913E-01	FAIL ABUN
RA-223	1.052E+00	FAIL ABUN
AC-225	4.982E+00	NOT IDENT.
AC-227	4.662E-01	FAIL ABUN
TH-227	4.662E-01	FAIL ABUN
TH-229	1.046E+00	FAIL ABUN
PA-231	9.520E-01	NOT IDENT.
TH-231	1.052E+00	FAIL ABUN
PA-233	1.169E-01	FAIL ABUN
PA-234	5.551E-01	FAIL ABUN
PA-234M	7.905E+00	NOT IDENT.
NP-237	1.169E-01	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	4.462E-01	FAIL ABUN
PU-239	6.163E+02	NOT IDENT.
AM-241	3.783E-01	NOT IDENT.
CM-243	1.945E-01	FAIL ABUN
BK-247	1.479E-01	NOT IDENT.
CM-247	7.421E-02	NOT IDENT.
CF-249	9.041E-02	NOT IDENT.
CF-251	2.226E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:31.73

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G609724006.CNF;1		
Acquisition date	: 28-FEB-2023 05:20:47	Sensitivity	: 3.000
Detector ID	: GAM02	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.21	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:30:00	Nuclide Library	: SOLID
Sample ID	: G609724006	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 7.2050E+01 GRAM
		Quantity Err(%)	: 1.3879E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-SEP-2022 06:33:35	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	9.627E+00	2.634E+00	2.634E+00
CD-109	5.294E+00	2.577E+00	2.577E+00
SN-126	4.994E-01	2.417E-01	2.417E-01
TL-208	6.155E-01	1.839E-01	1.839E-01
BI-210	1.245E+01	1.746E+01	1.746E+01
PB-210	1.245E+01	1.746E+01	1.746E+01
BI-211	1.075E+01	1.595E+00	1.595E+00
BI-212	3.170E+00	1.653E+00	1.653E+00
PB-212	2.186E+00	3.129E-01	3.129E-01
BI-214	3.488E+00	5.520E-01	5.520E-01
PB-214	3.902E+00	5.755E-01	5.755E-01
RN-222	3.488E+00	5.520E-01	5.520E-01
RA-224	9.924E+00	2.249E+00	2.249E+00
RA-226	3.902E+00	5.755E-01	5.755E-01
AC-228	2.585E+00	6.554E-01	6.554E-01
RA-228	2.585E+00	6.554E-01	6.554E-01
TH-228	2.186E+00	3.129E-01	3.129E-01
TH-230	3.902E+00	5.755E-01	5.755E-01
TH-232	2.585E+00	6.554E-01	6.554E-01
TH-234	3.418E+00	4.968E+00	4.968E+00
U-234	3.902E+00	5.755E-01	5.755E-01
U-235	3.802E-01	6.178E-01	6.178E-01
U-238	3.418E+00	4.968E+00	4.968E+00
AM-243	6.655E-01	2.007E-01	2.007E-01
ANH-511	8.076E-02	1.495E-01	1.495E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.258E-01	1.106E+00	1.131E+00	NOT IDENT.
NA-22	-2.192E-02	9.172E-02	9.225E-02	NOT IDENT.
NA-24	-7.104E+15	3.321E+17	0.000E+00	SHORT HLIF
AL-26	-2.268E-03	7.086E-02	7.087E-02	NOT IDENT.
SC-46	5.685E-02	1.193E-01	1.221E-01	FAIL ABUN

V-48	-1.693E-01	3.865E-01	3.939E-01	NOT IDENT.
CR-51	1.371E-01	1.460E+00	1.461E+00	NOT IDENT.
MN-52	-6.118E+00	9.840E+00	1.022E+01	FAIL ABUN
MN-54	-3.831E-02	8.529E-02	8.703E-02	NOT IDENT.
CO-56	7.663E-03	1.060E-01	1.061E-01	FAIL ABUN
MN-56	1.000E+41	1.213E+42	0.000E+00	SHORT HLIF
CO-57	9.786E-03	5.590E-02	5.608E-02	NOT IDENT.
CO-58	8.496E-02	1.110E-01	1.174E-01	NOT IDENT.
FE-59	-2.869E-02	2.795E-01	2.798E-01	NOT IDENT.
CO-60	-1.539E-02	8.743E-02	8.771E-02	NOT IDENT.
ZN-65	3.350E-02	2.143E-01	2.148E-01	NOT IDENT.
GE-68	-1.594E+00	2.180E+00	2.295E+00	NOT IDENT.
AS-73	2.609E+00	3.432E+00	3.628E+00	NOT IDENT.
AS-74	-2.132E-01	5.415E-01	5.500E-01	NOT IDENT.
SE-75	2.747E-02	1.100E-01	1.107E-01	NOT IDENT.
BR-77	3.354E+05	3.782E+05	4.073E+05	SHORT HLIF
SR-82	-7.481E-01	1.227E+00	1.273E+00	NOT IDENT.
RB-83	-7.511E-04	1.881E-01	1.881E-01	NOT IDENT.
RB-84	6.179E-02	2.709E-01	2.724E-01	NOT IDENT.
KR-85	7.164E+00	1.772E+01	1.801E+01	NOT IDENT.
SR-85	4.836E-02	1.203E-01	1.223E-01	NOT IDENT.
RB-86	-2.008E+00	3.171E+00	3.298E+00	NOT IDENT.
Y-88	3.183E-02	1.192E-01	1.200E-01	NOT IDENT.
Y-91	2.594E+01	5.817E+01	5.933E+01	NOT IDENT.
NB-94	5.838E-02	7.913E-02	8.339E-02	NOT IDENT.
NB-95	1.702E-01	1.279E-01	1.492E-01	NOT IDENT.
NB-95M	-8.097E-02	3.614E-01	3.633E-01	NOT IDENT.
ZR-95	2.645E-02	1.920E-01	1.924E-01	NOT IDENT.
NB-97	-1.000E+41	2.967E+41	0.000E+00	SHORT HLIF
ZR-97	-1.748E+16	6.050E+16	0.000E+00	SHORT HLIF
MO-99	1.184E+03	1.062E+04	1.063E+04	SHORT HLIF
TC-99M	1.000E+41	4.655E+41	0.000E+00	SHORT HLIF
RH-101	-8.577E-02	7.752E-02	8.663E-02	NOT IDENT.
RH-102	1.279E-01	1.219E-01	1.348E-01	FAIL ABUN
RU-103	-3.502E-02	1.306E-01	1.316E-01	FAIL ABUN
RH-106	-3.210E-01	7.959E-01	8.090E-01	NOT IDENT.
RU-106	-3.210E-01	7.959E-01	8.090E-01	NOT IDENT.
AG-108M	6.284E-02	6.145E-02	6.766E-02	NOT IDENT.
AG-110	-7.503E-01	1.572E+00	1.608E+00	NOT IDENT.
AG-110M	-3.102E-02	1.453E-01	1.460E-01	NOT IDENT.
SN-113	-1.350E-01	1.320E-01	1.453E-01	NOT IDENT.
CD-115	-1.839E+04	3.888E+04	3.975E+04	SHORT HLIF
SN-117M	1.126E-01	4.025E-01	4.056E-01	NOT IDENT.
SB-122	7.489E+02	1.674E+03	1.708E+03	SHORT HLIF
TE-123M	7.703E-03	7.010E-02	7.019E-02	NOT IDENT.
SB-124	9.294E-02	1.881E-01	1.927E-01	NOT IDENT.
SB-125	-4.625E-02	2.176E-01	2.186E-01	FAIL ABUN
TE-125M	3.773E+00	2.944E+01	2.949E+01	NOT IDENT.
I-126	1.423E+00	1.791E+00	1.902E+00	NOT IDENT.
SB-126	6.337E-01	1.216E+00	1.249E+00	NOT IDENT.
SB-127	-1.192E+00	1.869E+02	1.869E+02	SHORT HLIF
I-131	1.293E+00	2.174E+00	2.251E+00	FAIL ABUN
I-132	1.000E+41	4.469E+42	0.000E+00	SHORT HLIF
TE-132	-1.176E+01	2.761E+02	2.762E+02	SHORT HLIF
BA-133	-1.525E-02	1.096E-01	1.098E-01	NOT IDENT.
I-133	1.756E+12	2.039E+12	2.188E+12	SHORT HLIF
CS-134	1.520E-01	1.587E-01	1.728E-01	FAIL ABUN
I-135	-1.000E+41	1.811E+41	0.000E+00	SHORT HLIF
CS-136	-5.259E-01	7.366E-01	7.739E-01	NOT IDENT.
BA-137M	3.237E-02	7.029E-02	7.179E-02	NOT IDENT.
CS-137	3.420E-02	7.426E-02	7.584E-02	NOT IDENT.
LA-138	-2.827E-02	1.256E-01	1.262E-01	NOT IDENT.
CE-139	-9.670E-03	6.941E-02	6.955E-02	NOT IDENT.
BA-140	-1.373E+00	2.291E+00	2.373E+00	NOT IDENT.
LA-140	-5.461E-01	6.914E-01	7.339E-01	FAIL ABUN
CE-141	2.817E-02	2.353E-01	2.357E-01	NOT IDENT.
CE-143	8.259E+07	4.411E+07	5.773E+07	SHORT HLIF
CE-144	-2.132E-02	4.718E-01	4.718E-01	FAIL ABUN
PM-144	-5.870E-02	7.296E-02	7.761E-02	NOT IDENT.
PR-144	-4.483E+00	5.523E+00	5.881E+00	NOT IDENT.
PM-146	9.208E-02	9.840E-02	1.068E-01	NOT IDENT.
ND-147	1.525E+00	5.187E+00	5.232E+00	FAIL ABUN
PM-147	8.921E+02	1.612E+03	1.662E+03	NOT IDENT.
PM-149	-1.021E+05	3.671E+05	3.700E+05	SHORT HLIF
EU-150	5.009E-03	7.392E-02	7.396E-02	FAIL ABUN
EU-152	9.227E-02	2.379E-01	2.415E-01	FAIL ABUN
GD-153	6.537E-02	2.567E-01	2.584E-01	FAIL ABUN
EU-154	-7.209E-02	2.546E-01	2.567E-01	NOT IDENT.

EU-155	1.208E-01	2.473E-01	2.532E-01	FAIL ABUN
TB-160	1.219E-02	3.636E-01	3.637E-01	FAIL ABUN
HO-166M	1.276E-01	1.288E-01	1.410E-01	FAIL ABUN
TM-171	-5.543E+01	6.312E+01	6.789E+01	NOT IDENT.
HF-172	5.842E-01	4.223E-01	4.977E-01	FAIL ABUN
LU-172	8.598E-03	1.201E-01	1.202E-01	FAIL ABUN
LU-176	-3.576E-02	5.455E-02	5.689E-02	FAIL ABUN
HF-181	4.120E-02	1.429E-01	1.441E-01	NOT IDENT.
TA-182	5.230E-01	3.985E-01	4.630E-01	FAIL ABUN
RE-183	1.695E-02	7.928E-01	7.928E-01	NOT IDENT.
RE-184	7.250E-02	4.796E-01	4.808E-01	NOT IDENT.
W-188	2.435E+01	3.138E+01	3.325E+01	FAIL ABUN
IR-192	3.516E-02	9.719E-02	9.847E-02	FAIL ABUN
HG-203	4.039E-02	1.327E-01	1.340E-01	NOT IDENT.
TL-204	2.815E-01	1.473E+01	1.473E+01	FAIL ABUN
BI-207	1.499E-02	1.009E-01	1.011E-01	FAIL ABUN
PB-211	3.198E-01	1.637E+00	1.643E+00	NOT IDENT.
BI-213	1.379E-01	2.332E-01	2.414E-01	NOT IDENT.
RN-219	-2.848E-01	1.009E+00	1.018E+00	FAIL ABUN
RA-223	-6.699E-01	1.533E+00	1.562E+00	FAIL ABUN
AC-225	-9.476E+00	6.959E+00	8.166E+00	NOT IDENT.
AC-227	7.281E-02	5.589E-01	5.599E-01	FAIL ABUN
TH-227	7.281E-02	5.589E-01	5.599E-01	FAIL ABUN
TH-229	1.572E+00	1.158E+00	1.357E+00	FAIL ABUN
PA-231	1.198E+00	1.185E+00	1.302E+00	NOT IDENT.
TH-231	-6.699E-01	1.533E+00	1.562E+00	FAIL ABUN
PA-233	7.567E-02	1.354E-01	1.396E-01	FAIL ABUN
PA-234	-1.392E-01	7.113E-01	7.141E-01	FAIL ABUN
PA-234M	-5.532E+00	1.065E+01	1.094E+01	NOT IDENT.
NP-237	7.567E-02	1.354E-01	1.396E-01	FAIL ABUN
NP-238	1.767E+04	8.818E+04	8.854E+04	SHORT HLIF
NP-239	-3.994E-01	6.174E-01	6.431E-01	FAIL ABUN
PU-239	1.490E+02	7.962E+02	7.990E+02	NOT IDENT.
AM-241	7.723E-02	5.177E-01	5.189E-01	NOT IDENT.
CM-243	-9.812E-02	2.606E-01	2.643E-01	FAIL ABUN
BK-247	2.816E-02	1.852E-01	1.857E-01	NOT IDENT.
CM-247	1.313E-02	9.045E-02	9.064E-02	NOT IDENT.
CF-249	1.433E-01	9.909E-02	1.183E-01	NOT IDENT.
CF-251	2.037E-02	2.647E-01	2.648E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	105.5464	85.43	115.7225	131.20	89.5428
45.60	100.6290	86.55	115.9551	133.02	84.9098
46.54	95.3539	86.79	116.0044	133.52	84.9664
49.72	0.0000	86.94	116.0358	136.00	98.6434
51.35	88.1445	87.09	116.0663	136.47	101.1411
51.87	86.1572	87.57	116.1650	140.51	0.0000
52.39	96.7884	88.03	116.2598	143.76	86.1082
52.97	83.2299	88.34	116.3232	144.24	86.1606
53.44	70.6684	88.47	116.3499	145.44	86.2909
54.07	87.6781	89.96	116.6530	152.43	88.2852
57.36	0.0000	1093.63	116.7908	153.25	89.6188
57.53	100.1142	91.11	116.8856	323.87	85.9847
57.98	105.5489	92.59	117.1825	156.02	112.3984
59.27	100.5147	93.35	117.3344	158.56	90.1923
59.32	95.5355	94.56	117.5741	159.00	87.7328
59.54	111.2760	94.65	117.5921	162.33	78.0118
60.96	100.1832	94.67	117.5961	162.66	89.3697
61.17	100.2302	94.87	117.6360	163.33	82.3017
62.93	99.1835	97.43	64.4390	165.86	82.5430
63.29	99.2616	98.43	93.7438	176.31	78.4074
63.58	99.3244	98.44	93.7451	176.60	77.5801
64.28	98.0336	99.53	93.9123	177.52	74.2452
66.73	94.1999	100.11	107.8697	181.07	0.0000
67.24	111.7105	102.03	100.4748	181.52	68.1408
125.81	115.4442	103.18	99.8850	184.41	70.9328
67.75	115.4604	103.37	108.0478	143.76	82.6553
68.89	135.3875	105.21	87.3882	193.51	65.1047
69.67	126.8573	105.31	87.4020	197.03	80.1509
70.82	131.5393	106.12	87.5130	198.01	56.6846
70.83	131.5421	106.47	101.5701	201.83	82.2921
72.81	141.9726	109.28	89.1129	203.43	80.6703
72.87	141.9894	111.00	101.1028	205.31	77.7472
74.66	142.4933	111.76	0.0000	210.85	71.5465
74.82	142.5385	114.06	99.2053	215.65	59.4558
74.97	142.5799	116.30	0.0000	218.12	90.7286
77.11	143.1734	116.74	98.4124	222.11	74.9996
78.74	143.6192	119.76	69.0719	227.09	69.9662
79.69	143.8780	121.12	69.2064	227.38	67.2935
80.03	140.6205	121.22	69.2166	228.16	0.0000
80.12	140.6455	121.78	75.2432	228.18	77.2201
80.19	140.6637	122.06	69.2994	116.74	77.2201
80.57	118.4203	122.92	84.9354	235.69	70.5169
81.00	140.8767	123.07	86.1498	235.96	70.5344
81.07	140.8954	265.00	88.6191	238.63	66.1711
81.75	141.0732	125.81	58.8552	238.98	0.0000
82.47	112.1124	127.23	110.7208	240.99	66.3100
83.79	115.3794	127.91	99.9835	242.00	66.3694
84.00	115.4240	129.30	85.6906	244.70	58.7805

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	49.2035	563.25	22.2689
252.80	44.9695	345.93	50.2446	564.24	0.0000
254.15	0.0000	351.06	40.5329	569.33	22.3324
256.23	58.9076	351.93	40.5571	946.00	22.3340
260.90	0.0000	355.39	0.0000	569.70	18.9860
264.66	51.9098	356.01	47.6113	583.19	31.4670
264.80	60.2591	364.49	41.8940	584.27	42.1646
265.00	55.6323	366.42	0.0000	595.83	29.3886
269.46	61.4211	372.51	35.0947	427.87	16.9916
270.03	61.4493	375.05	48.2090	602.52	0.0000
271.23	61.5098	377.52	36.2139	604.72	25.5341
273.65	51.8257	356.01	33.3297	607.14	27.2666
276.40	68.3187	388.16	32.4069	609.32	27.2930
277.37	59.0061	388.63	39.5078	610.33	27.3047
277.60	59.0164	391.69	59.8823	614.28	29.0621
278.00	51.5390	264.66	36.7412	618.01	18.2650
279.20	65.6578	401.81	49.0225	620.36	25.1403
279.54	77.8724	402.40	42.9100	621.93	29.7324
279.70	77.8817	404.85	37.8582	630.19	0.0000
280.46	74.1734	410.95	33.8903	631.29	14.9270
283.69	55.5370	413.71	43.2040	633.25	17.2382
284.31	64.9823	414.70	38.0832	634.78	25.2987
285.41	59.3829	423.72	36.2169	635.95	18.4082
285.90	0.0000	427.09	36.2889	636.99	11.5104
287.50	43.9022	427.87	39.4171	657.50	20.9004
290.67	55.3674	433.94	20.8187	657.76	19.7413
293.27	0.0000	439.40	29.2379	657.90	0.0000
351.93	41.3149	440.45	28.2101	661.66	15.1206
295.96	41.3388	453.88	26.3189	664.57	0.0000
879.38	41.4211	463.37	22.2241	666.33	18.6465
299.98	41.4654	468.07	33.4220	666.50	18.6478
300.09	41.4689	473.00	0.0000	667.71	0.0000
300.13	41.4698	475.06	41.5367	677.62	32.4913
301.36	41.5087	476.78	33.0466	685.70	0.0000
302.85	44.4206	477.60	34.1276	692.65	0.0000
256.23	35.8673	482.18	26.7278	695.00	19.4554
304.85	33.0070	487.02	25.7246	696.49	26.5466
306.78	47.9055	492.35	0.0000	696.51	26.5466
308.46	40.2902	497.08	25.8604	697.00	25.6671
311.90	37.5075	505.52	42.2064	697.30	24.7845
316.51	44.3894	507.63	0.0000	697.49	24.7863
319.41	52.2191	511.00	34.7282	702.65	23.0634
320.08	44.5045	514.00	29.3467	706.68	24.3700
321.04	41.6309	514.00	29.3467	711.68	18.6948
323.87	48.0206	520.40	26.1699	720.70	20.5482
325.23	45.1547	520.69	0.0000	721.93	0.0000
328.76	39.4272	522.65	0.0000	722.78	30.0429
333.37	35.1599	527.90	0.0000	722.91	30.0439
333.97	35.1746	528.26	24.0840	723.31	27.1873
334.37	35.1848	529.59	16.4319	724.19	25.7651
338.28	42.6309	529.87	0.0000	727.33	21.4966
338.32	42.6318	531.02	20.8284	733.00	17.2354
311.90	48.5846	537.26	34.0866	735.93	21.5684
340.48	48.5846	546.56	0.0000	333.97	16.1856
340.55	48.5866	552.55	21.0480	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	18.9326	949.00	14.5139	1384.29	7.6127
747.24	21.6621	667.71	0.0000	1408.01	15.3082
748.06	24.3773	962.31	27.9826	1434.09	9.8992
752.31	24.4160	964.08	15.5547	1435.80	8.8027
753.82	19.9059	966.17	15.5645	1457.56	0.0000
756.73	18.1165	911.20	15.5781	1460.82	12.1716
756.80	18.1171	983.53	14.6700	1489.16	7.7938
884.68	17.4387	984.45	0.0000	1505.03	3.5752
765.81	10.1797	1274.44	11.7814	1584.12	11.8155
766.42	17.4551	1001.03	17.6979	1596.21	10.0230
766.84	21.8218	1002.74	14.7556	1620.50	7.3258
772.60	0.0000	1004.73	17.7171	1621.92	5.4958
776.52	19.1626	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.5479
778.90	18.2660	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	13.9163	1764.49	4.7097
788.74	23.4648	1038.76	0.0000	1063.66	1.5716
792.07	20.5570	631.29	14.9478	1771.35	4.7158
795.86	20.2175	1048.07	15.9512	1791.20	0.0000
810.06	13.3009	1049.04	18.9478	1808.65	4.7488
810.29	14.7798	1050.41	15.9619	1810.72	0.0000
344.28	14.7808	1063.66	11.0161	1836.06	6.6821
810.76	11.8258	1077.00	11.0584		
815.77	20.3618	1077.34	11.0591		
1048.07	11.1174	1085.87	12.0938		
832.01	18.6169	1093.63	10.1001		
834.85	23.2941	1099.45	13.1516		
835.71	21.4369	1112.07	13.1976		
836.80	0.0000	1112.84	10.4445		
846.75	0.0000	1115.54	13.0070		
846.77	17.7766	1120.29	16.2803		
856.80	7.5107	1120.55	16.2813		
860.56	9.6689	1221.41	19.5422		
871.09	17.9244	1129.67	15.3021		
873.19	21.7134	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	17.0283	1173.23	14.8632		
880.51	17.0349	1177.95	13.4348		
881.60	18.9343	1189.05	16.5840		
883.24	23.6809	1204.77	12.4885		
884.68	28.4308	1221.41	5.2261		
889.28	18.9825	1231.02	16.7646		
894.76	14.2630	1235.36	8.3916		
898.04	16.1819	1238.28	20.1551		
900.72	16.1964	1260.41	0.0000		
903.28	20.0240	1271.87	12.7031		
911.20	14.3399	1274.44	12.7112		
912.08	14.3436	1274.54	12.7119		
923.98	0.0000	1291.59	5.3189		
926.50	11.5283	1298.22	0.0000		
929.11	15.3843	1312.11	6.4146		
935.54	20.0402	1332.49	10.7434		
937.49	13.8828	1362.66	0.0000		
944.13	15.4575	1365.19	8.6616		
946.00	19.3335	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:21:59.58

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313910.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;568
                                    Background date  : 26-FEB-2023 09:14:32
Sample date      : 8-FEB-2023 00:00:00. Acquisition date : 28-FEB-2023 05:21:28
Sample ID        : G1205313910          Sample quantity  : 1.37480E+02 GRAM
Detector name    : GAM33                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.75  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2379916              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	92.76*	5	66	1.15	185.13	179	13	1.36E-03	400.6	
2	0	121.20	24	21	1.39	242.06	238	7	6.56E-03	39.0	
3	1	185.99*	2	25	1.35	371.76	366	26	5.74E-04	586.5	1.73E+00
4	1	194.13	19	21	1.36	388.04	366	26	5.34E-03	46.8	
5	0	238.54*	6	12	1.39	476.94	473	7	1.60E-03	142.5	
6	0	269.40*	5	19	0.96	538.73	535	8	1.48E-03	153.3	
7	0	282.48	32	41	5.30	564.90	553	24	8.83E-03	56.7	
8	0	314.85	11	13	0.63	629.71	627	7	3.15E-03	59.4	
9	0	388.60	11	12	1.54	777.35	773	10	3.08E-03	66.4	
10	0	484.21	10	1	1.47	968.74	966	6	2.70E-03	37.4	
11	0	520.59	14	0	0.55	1041.57	1036	10	3.89E-03	26.7	
12	0	564.69*	16	3	1.31	1129.87	1124	12	4.41E-03	35.9	
13	0	633.07	8	4	1.06	1266.75	1261	8	2.22E-03	55.9	
14	0	711.65	8	3	1.49	1424.08	1421	6	2.17E-03	50.4	
15	0	715.12	8	3	0.70	1431.02	1427	8	2.17E-03	55.8	
16	0	785.60	6	4	1.24	1572.13	1567	8	1.78E-03	66.3	
17	0	960.02	7	3	1.31	1921.36	1915	9	2.07E-03	52.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 06:22:00

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313910.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 8-FEB-2023 00:00:00	Acquisition date	: 28-FEB-2023 05:21:28
Sample ID	: G1205313910	Sample quantity	: 137.48 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA33	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.75 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-57	122.06	27	85.60*	5.943E+00	2.946E-02	3.102E-02	78.01
	136.47	------	10.68	5.896E+00	------ Line Not Found		------
BR-77	238.98	6	23.10*	4.417E+00	3.408E-02	1.249E+01	285.00
	520.69	15	22.40	2.546E+00	1.397E-01	5.121E+01	53.45
SB-122	564.24	16	70.67*	2.394E+00	5.302E-02	9.223E+00	71.82
	692.65	------	3.85	2.037E+00	------ Line Not Found		------
PM-147	121.22	27	0.00*	5.943E+00	8.848E+02	8.978E+02	78.01
CF-249	252.80	------	2.50	4.245E+00	------ Line Not Found		------
	333.37	------	14.60	3.500E+00	------ Line Not Found		------
	388.16	12	66.00*	3.143E+00	3.112E-02	3.112E-02	132.87

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:22:01.51

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313910.CNF;1		
Acquisition date	: 28-FEB-2023 05:21:28	Sensitivity	: 3.000
Detector ID	: GAM33	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.75	Half life ratio	: *****
Sample date	: 8-FEB-2023 00:00:00	Analyst initials	: RXF2
Sample ID	: G1205313910	Sample Quantity	: 1.3748E+02 GRAM
Batch Number	: 2379916	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	: 25-JUL-2022 07:37:58	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;15		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CO-57	3.102E-02	2.371E-02	2.477E-02
BR-77	1.249E+01	3.489E+01	4.715E+01
SB-122	9.223E+00	6.491E+00	9.218E+00
PM-147	8.978E+02	6.864E+02	7.550E+02
CF-249	3.112E-02	4.052E-02	5.477E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-1.251E-01		1.619E-01	2.754E-01	NOT IDENT.
NA-22	6.154E-03		2.065E-02	5.195E-02	NOT IDENT.
NA-24	0.000E+00		1.774E+08	0.000E+00	SHORT HLIF
AL-26	-4.438E-04		1.682E-02	4.293E-02	NOT IDENT.
K-40	-1.146E-01		3.178E-01	7.253E-01	NOT IDENT.
SC-46	-8.367E-04		2.084E-02	4.426E-02	NOT IDENT.
V-48	-8.054E-03		4.162E-02	9.121E-02	NOT IDENT.
CR-51	-1.076E-01		2.126E-01	4.063E-01	NOT IDENT.
MN-52	-6.219E-02		1.219E-01	1.689E-01	NOT IDENT.
MN-54	-3.287E-03		2.383E-02	4.654E-02	NOT IDENT.
CO-56	-3.667E-03		2.231E-02	4.476E-02	NOT IDENT.
MN-56	0.000E+00		1.960E+41	0.000E+00	SHORT HLIF
CO-58	-2.074E-02		3.178E-02	5.302E-02	NOT IDENT.
FE-59	-1.931E-02		4.339E-02	8.674E-02	NOT IDENT.
CO-60	6.174E-03		1.688E-02	4.678E-02	NOT IDENT.
ZN-65	-2.581E-02		5.160E-02	9.792E-02	NOT IDENT.
GE-68	-6.470E-01		6.866E-01	1.078E+00	NOT IDENT.
AS-73	-9.552E-01		6.735E-01	1.015E+00	NOT IDENT.
AS-74	1.965E-02		8.456E-02	1.746E-01	NOT IDENT.
SE-75	1.594E-03		2.749E-02	5.490E-02	FAIL ABUN
SR-82	-1.753E-01		2.483E-01	4.076E-01	NOT IDENT.
RB-83	8.184E-02		4.287E-02	9.882E-02	FAIL ABUN
RB-84	-1.108E-03		5.058E-02	1.023E-01	NOT IDENT.
KR-85	-5.442E+00		7.825E+00	1.358E+01	NOT IDENT.
SR-85	-3.057E-02		4.375E-02	7.591E-02	NOT IDENT.

RB-86	-2.308E-01	4.829E-01	9.435E-01	NOT IDENT.
Y-88	1.239E-02	3.326E-02	8.082E-02	NOT IDENT.
Y-91	-1.398E+01	1.331E+01	1.995E+01	NOT IDENT.
NB-94	1.010E-02	2.223E-02	4.870E-02	NOT IDENT.
NB-95	-3.637E-03	2.588E-02	5.103E-02	NOT IDENT.
NB-95M	-5.293E-02	7.442E-02	1.198E-01	NOT IDENT.
ZR-95	3.779E-02	5.037E-02	1.178E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	2.455E+08	0.000E+00	SHORT HLIF
MO-99	-1.491E+01	2.905E+01	5.131E+01	NOT IDENT.
TC-99M	0.000E+00	2.891E+22	0.000E+00	SHORT HLIF
RH-101	-3.026E-03	1.739E-02	3.258E-02	NOT IDENT.
RH-102	7.350E-03	3.748E-02	7.263E-02	NOT IDENT.
RU-103	-8.483E-06	2.556E-02	5.295E-02	NOT IDENT.
RH-106	5.045E-02	2.670E-01	5.379E-01	NOT IDENT.
RU-106	5.045E-02	2.670E-01	5.379E-01	NOT IDENT.
AG-108M	5.306E-03	2.152E-02	4.294E-02	NOT IDENT.
CD-109	5.644E-01	4.774E-01	1.006E+00	NOT IDENT.
AG-110	4.153E-02	4.068E-01	8.709E-01	NOT IDENT.
AG-110M	-1.562E-03	3.296E-02	6.626E-02	NOT IDENT.
SN-113	1.130E-03	3.335E-02	6.126E-02	NOT IDENT.
CD-115	-1.412E+01	3.272E+01	6.128E+01	NOT IDENT.
SN-117M	-1.347E-03	3.437E-02	6.616E-02	NOT IDENT.
TE-123M	-4.746E-03	1.405E-02	2.552E-02	NOT IDENT.
SB-124	-1.576E-02	3.090E-02	4.055E-02	NOT IDENT.
SB-125	-2.145E-02	5.194E-02	9.904E-02	NOT IDENT.
TE-125M	-2.214E+00	5.848E+00	1.067E+01	NOT IDENT.
I-126	-1.042E-01	2.373E-01	4.252E-01	FAIL ABUN
SB-126	1.446E-02	5.630E-02	1.515E-01	NOT IDENT.
SN-126	1.644E-02	5.108E-02	9.501E-02	NOT IDENT.
SB-127	2.313E-01	1.888E+00	4.038E+00	NOT IDENT.
I-131	-1.977E-02	1.195E-01	2.366E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	-6.594E-01	1.174E+00	2.249E+00	NOT IDENT.
BA-133	-5.815E-03	2.273E-02	4.525E-02	NOT IDENT.
I-133	0.000E+00	2.083E+05	0.000E+00	SHORT HLIF
CS-134	-2.042E-02	2.348E-02	3.510E-02	FAIL ABUN
I-135	0.000E+00	1.287E+21	0.000E+00	SHORT HLIF
CS-136	5.671E-03	9.740E-02	2.094E-01	NOT IDENT.
BA-137M	-4.086E-03	2.284E-02	4.445E-02	NOT IDENT.
CS-137	-4.316E-03	2.413E-02	4.696E-02	NOT IDENT.
LA-138	-1.177E-05	2.139E-02	5.695E-02	NOT IDENT.
CE-139	-4.003E-03	1.900E-02	3.455E-02	NOT IDENT.
BA-140	2.307E-02	2.209E-01	4.616E-01	NOT IDENT.
LA-140	-2.970E-03	1.082E-01	2.252E-01	NOT IDENT.
CE-141	-1.492E-02	4.099E-02	7.342E-02	NOT IDENT.
CE-143	0.000E+00	7.868E+02	0.000E+00	SHORT HLIF
CE-144	8.057E-02	1.138E-01	2.401E-01	NOT IDENT.
PM-144	5.878E-03	2.023E-02	4.431E-02	NOT IDENT.
PR-144	4.411E-01	1.518E+00	3.325E+00	NOT IDENT.
PM-146	1.384E-02	2.513E-02	5.694E-02	FAIL ABUN
ND-147	1.848E-01	4.590E-01	1.026E+00	NOT IDENT.
PM-149	-4.033E+01	2.445E+02	4.965E+02	NOT IDENT.
EU-150	8.515E-03	1.690E-02	3.692E-02	NOT IDENT.
EU-152	-3.254E-02	6.064E-02	1.133E-01	FAIL ABUN
GD-153	-3.003E-03	4.721E-02	8.475E-02	NOT IDENT.
EU-154	2.003E-02	5.947E-02	1.502E-01	NOT IDENT.
EU-155	-6.269E-02	6.332E-02	1.038E-01	NOT IDENT.
TB-160	1.846E-02	7.756E-02	1.743E-01	NOT IDENT.
HO-166M	4.026E-02	3.974E-02	9.990E-02	FAIL ABUN
TM-171	9.229E+00	1.404E+01	3.171E+01	NOT IDENT.
HF-172	-3.217E-03	9.483E-02	1.840E-01	NOT IDENT.
LU-172	-7.970E-03	3.905E-02	8.093E-02	FAIL ABUN
LU-176	-4.711E-03	1.409E-02	2.782E-02	NOT IDENT.
HF-181	-6.914E-03	2.801E-02	4.889E-02	NOT IDENT.
TA-182	-3.048E-02	1.004E-01	2.034E-01	NOT IDENT.
RE-183	-7.843E-02	1.698E-01	3.168E-01	NOT IDENT.
RE-184	-2.145E-02	6.607E-02	1.386E-01	NOT IDENT.
W-188	-8.047E-01	3.998E+00	7.728E+00	NOT IDENT.
IR-192	9.210E-03	2.353E-02	4.716E-02	NOT IDENT.
HG-203	2.320E-02	2.650E-02	5.961E-02	NOT IDENT.
TL-204	-1.207E+00	2.675E+00	4.970E+00	NOT IDENT.
BI-207	-1.522E-03	3.638E-02	7.950E-02	NOT IDENT.
TL-208	-2.488E-02	2.646E-02	4.929E-02	NOT IDENT.
BI-210	2.436E+00	4.063E+00	8.814E+00	NOT IDENT.
PB-210	2.436E+00	4.063E+00	8.814E+00	NOT IDENT.
BI-211	-9.986E-02	1.421E-01	2.606E-01	NOT IDENT.
PB-211	-4.116E-01	4.087E-01	6.623E-01	NOT IDENT.

BI-212	2.571E-01	3.219E-01	7.582E-01	NOT IDENT.
PB-212	1.806E-02	5.044E-02	8.438E-02	FAIL ABUN
BI-213	-3.897E-03	5.156E-02	1.080E-01	NOT IDENT.
BI-214	1.665E-03	5.167E-02	1.048E-01	NOT IDENT.
PB-214	-2.497E-02	5.222E-02	9.919E-02	NOT IDENT.
RN-219	1.116E-01	2.415E-01	5.350E-01	NOT IDENT.
RN-222	1.665E-03	5.167E-02	1.048E-01	NOT IDENT.
RA-223	2.425E-01	3.787E-01	8.510E-01	FAIL ABUN
RA-224	8.672E-02	3.779E-01	7.385E-01	NOT IDENT.
AC-225	-4.595E-03	4.850E-01	9.988E-01	NOT IDENT.
RA-226	-2.497E-02	5.222E-02	9.919E-02	NOT IDENT.
AC-227	3.293E-02	1.465E-01	3.115E-01	NOT IDENT.
TH-227	3.293E-02	1.465E-01	3.115E-01	NOT IDENT.
AC-228	-4.637E-02	1.053E-01	2.116E-01	NOT IDENT.
RA-228	-4.637E-02	1.053E-01	2.116E-01	NOT IDENT.
TH-228	1.806E-02	5.044E-02	8.438E-02	FAIL ABUN
TH-229	5.301E-01	4.861E-01	6.138E-01	FAIL ABUN
TH-230	-2.497E-02	5.222E-02	9.919E-02	NOT IDENT.
PA-231	1.734E-01	2.379E-01	5.572E-01	FAIL ABUN
TH-231	2.425E-01	3.787E-01	8.510E-01	FAIL ABUN
TH-232	-4.637E-02	1.053E-01	2.116E-01	NOT IDENT.
PA-233	1.776E-02	4.156E-02	8.383E-02	NOT IDENT.
PA-234	7.114E-02	1.884E-01	4.409E-01	NOT IDENT.
PA-234M	-8.298E-01	3.160E+00	7.051E+00	NOT IDENT.
TH-234	-8.452E-02	1.114E+00	2.428E+00	FAIL ABUN
U-234	-2.497E-02	5.222E-02	9.919E-02	NOT IDENT.
U-235	-8.939E-02	1.385E-01	2.495E-01	FAIL ABUN
NP-237	1.776E-02	4.156E-02	8.383E-02	NOT IDENT.
NP-238	9.790E+00	4.402E+01	1.132E+02	NOT IDENT.
U-238	-8.452E-02	1.114E+00	2.428E+00	FAIL ABUN
NP-239	-5.541E-02	1.279E-01	2.322E-01	NOT IDENT.
PU-239	8.235E+01	1.973E+02	3.990E+02	NOT IDENT.
AM-241	5.580E-02	1.180E-01	2.490E-01	NOT IDENT.
AM-243	2.663E-02	3.226E-02	6.863E-02	NOT IDENT.
CM-243	3.630E-02	5.791E-02	1.231E-01	NOT IDENT.
BK-247	2.472E-02	4.971E-02	1.015E-01	FAIL ABUN
CM-247	8.739E-03	2.184E-02	4.808E-02	NOT IDENT.
CF-251	-1.755E-02	8.511E-02	1.538E-01	NOT IDENT.
ANH-511	-9.910E-02	4.213E-02	8.690E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:22:00.27

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-57	122.06	27	85.60*	5.943E+00	2.946E-02	3.102E-02	78.01
	136.47	------	10.68	5.896E+00	------ Line Not Found		------
BR-77	238.98	6	23.10*	4.417E+00	3.408E-02	1.249E+01	285.00
	520.69	15	22.40	2.546E+00	1.397E-01	5.121E+01	53.45
SB-122	564.24	16	70.67*	2.394E+00	5.302E-02	9.223E+00	71.82
	692.65	------	3.85	2.037E+00	------ Line Not Found		------
PM-147	121.22	27	0.00*	5.943E+00	8.848E+02	8.978E+02	78.01
CF-249	252.80	------	2.50	4.245E+00	------ Line Not Found		------
	333.37	------	14.60	3.500E+00	------ Line Not Found		------
	388.16	12	66.00*	3.143E+00	3.112E-02	3.112E-02	132.87

Flag: "*" = Keyline

Sample ID : G1205313910 Acquisition date : 28-FEB-2023 05:21:28

Total number of lines in spectrum 17
Number of unidentified lines 5
Number of lines tentatively identified by NID 12 70.59%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	1.05	2.946E-02	3.102E-02	2.420E-02	78.01	
BR-77	2.38D	367.	3.408E-02	1.249E+01	3.561E+01	285.00	
SB-122	2.72D	174.	5.302E-02	9.223E+00	6.624E+00	71.82	
PM-147	2.62Y	1.01	8.848E+02	8.978E+02	7.004E+02	78.01	
CF-249	351.00Y	1.00	3.112E-02	3.112E-02	4.135E-02	132.87	
	Total Activity :		8.849E+02	9.196E+02			

Grand Total Activity : 8.849E+02 9.196E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1205313910 Acquisition date : 28-FEB-2023 05:21:28

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.76	6	78	1.15	185.13	179	13	1.36E-03	****	5.18E+00	T
1	185.99	2	28	1.35	371.76	366	26	5.74E-04	****	5.18E+00	T
1	194.13	22	23	1.36	388.04	366	26	5.34E-03	93.6	5.05E+00	T
0	269.40	6	21	0.96	538.73	535	8	1.48E-03	****	4.06E+00	T
0	282.48	35	45	5.30	564.90	553	24	8.83E-03	****	3.93E+00	T
0	314.85	12	14	0.63	629.71	627	7	3.15E-03	****	3.64E+00	
0	484.21	10	1	1.47	968.74	966	6	2.70E-03	74.8	2.69E+00	
0	633.07	8	4	1.06	1266.75	1261	8	2.22E-03	****	2.19E+00	T
0	711.65	8	3	1.49	1424.08	1421	6	2.17E-03	****	1.99E+00	T
0	715.12	8	3	0.70	1431.02	1427	8	2.17E-03	****	1.98E+00	
0	785.60	6	4	1.24	1572.13	1567	8	1.78E-03	****	1.83E+00	
0	960.02	7	3	1.31	1921.36	1915	9	2.07E-03	****	1.53E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:22:10.56

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313910.CNF;1   *
* Acquisition date : 28-FEB-2023 05:21:28 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.75     Half life ratio : *****       *
* Sample date      :  8-FEB-2023 00:00:00 Nuclide Library : SOLID        *
* Sample ID        : G1205313910          Analyst initials: RXF2        *
* Batch Number     : 2379916              Sample Quantity : 1.3748E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUL-2022 07:37:58 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;15        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CO-57	1.078E-02
BR-77	2.082E+01
SB-122	3.834E+00
PM-147	3.311E+02
CF-249	2.373E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.029E-01	NOT IDENT.
NA-22	1.965E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.357E-02	NOT IDENT.
K-40	2.976E-01	NOT IDENT.
SC-46	1.675E-02	NOT IDENT.
V-48	3.363E-02	NOT IDENT.
CR-51	1.677E-01	NOT IDENT.
MN-52	0.000E+00	NOT IDENT.
MN-54	1.877E-02	NOT IDENT.
CO-56	1.715E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-58	2.136E-02	NOT IDENT.
FE-59	3.005E-02	NOT IDENT.
CO-60	1.687E-02	NOT IDENT.
ZN-65	3.733E-02	NOT IDENT.
GE-68	3.626E-01	NOT IDENT.
AS-73	4.174E-01	NOT IDENT.
AS-74	7.506E-02	NOT IDENT.
SE-75	2.390E-02	FAIL ABUN
SR-82	1.571E-01	NOT IDENT.
RB-83	4.166E-02	FAIL ABUN
RB-84	4.109E-02	NOT IDENT.
KR-85	6.114E+00	NOT IDENT.
SR-85	3.416E-02	NOT IDENT.
RB-86	3.393E-01	NOT IDENT.

Y-88	3.131E-02	NOT IDENT.
Y-91	7.067E+00	NOT IDENT.
NB-94	2.062E-02	NOT IDENT.
NB-95	2.052E-02	NOT IDENT.
NB-95M	5.127E-02	NOT IDENT.
ZR-95	4.982E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	2.036E+01	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.435E-02	NOT IDENT.
RH-102	3.013E-02	NOT IDENT.
RU-103	2.197E-02	NOT IDENT.
RH-106	2.336E-01	NOT IDENT.
RU-106	2.336E-01	NOT IDENT.
AG-108M	1.859E-02	NOT IDENT.
CD-109	4.584E-01	NOT IDENT.
AG-110	3.523E-01	NOT IDENT.
AG-110M	2.654E-02	NOT IDENT.
SN-113	2.641E-02	NOT IDENT.
CD-115	2.471E+01	NOT IDENT.
SN-117M	2.862E-02	NOT IDENT.
TE-123M	1.092E-02	NOT IDENT.
SB-124	0.000E+00	NOT IDENT.
SB-125	4.073E-02	NOT IDENT.
TE-125M	4.701E+00	NOT IDENT.
I-126	1.804E-01	FAIL ABUN
SB-126	5.368E-02	NOT IDENT.
SN-126	4.315E-02	NOT IDENT.
SB-127	1.639E+00	NOT IDENT.
I-131	1.020E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	9.711E-01	NOT IDENT.
BA-133	1.895E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	1.262E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	8.562E-02	NOT IDENT.
BA-137M	1.827E-02	NOT IDENT.
CS-137	1.930E-02	NOT IDENT.
LA-138	1.800E-02	NOT IDENT.
CE-139	1.534E-02	NOT IDENT.
BA-140	1.934E-01	NOT IDENT.
LA-140	8.938E-02	NOT IDENT.
CE-141	3.246E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.077E-01	NOT IDENT.
PM-144	1.829E-02	NOT IDENT.
PR-144	1.372E+00	NOT IDENT.
PM-146	2.430E-02	FAIL ABUN
ND-147	4.308E-01	NOT IDENT.
PM-149	2.123E+02	NOT IDENT.
EU-150	1.619E-02	NOT IDENT.
EU-152	4.827E-02	FAIL ABUN
GD-153	3.713E-02	NOT IDENT.
EU-154	5.720E-02	NOT IDENT.
EU-155	4.540E-02	NOT IDENT.
TB-160	6.900E-02	NOT IDENT.
HO-166M	4.299E-02	FAIL ABUN
TM-171	1.396E+01	NOT IDENT.
HF-172	8.025E-02	NOT IDENT.
LU-172	3.162E-02	FAIL ABUN
LU-176	1.171E-02	NOT IDENT.
HF-181	1.959E-02	NOT IDENT.
TA-182	7.653E-02	NOT IDENT.
RE-183	1.400E-01	NOT IDENT.
RE-184	5.130E-02	NOT IDENT.
W-188	3.261E+00	NOT IDENT.
IR-192	2.051E-02	NOT IDENT.
HG-203	2.661E-02	NOT IDENT.
TL-204	2.167E+00	NOT IDENT.
BI-207	3.261E-02	NOT IDENT.
TL-208	2.085E-02	NOT IDENT.
BI-210	3.957E+00	NOT IDENT.
PB-210	3.957E+00	NOT IDENT.
BI-211	1.129E-01	NOT IDENT.
PB-211	2.653E-01	NOT IDENT.
BI-212	3.216E-01	NOT IDENT.

PB-212	3.822E-02	FAIL ABUN
BI-213	4.383E-02	NOT IDENT.
BI-214	4.505E-02	NOT IDENT.
PB-214	4.326E-02	NOT IDENT.
RN-219	2.301E-01	NOT IDENT.
RN-222	4.505E-02	NOT IDENT.
RA-223	3.721E-01	FAIL ABUN
RA-224	3.267E-01	NOT IDENT.
AC-225	4.410E-01	NOT IDENT.
RA-226	4.326E-02	NOT IDENT.
AC-227	1.366E-01	NOT IDENT.
TH-227	1.366E-01	NOT IDENT.
AC-228	8.778E-02	NOT IDENT.
RA-228	8.778E-02	NOT IDENT.
TH-228	3.822E-02	FAIL ABUN
TH-229	2.725E-01	FAIL ABUN
TH-230	4.326E-02	NOT IDENT.
PA-231	2.406E-01	FAIL ABUN
TH-231	3.721E-01	FAIL ABUN
TH-232	8.778E-02	NOT IDENT.
PA-233	3.652E-02	NOT IDENT.
PA-234	1.804E-01	NOT IDENT.
PA-234M	2.925E+00	NOT IDENT.
TH-234	1.118E+00	FAIL ABUN
U-234	4.326E-02	NOT IDENT.
U-235	1.127E-01	FAIL ABUN
NP-237	3.652E-02	NOT IDENT.
NP-238	4.181E+01	NOT IDENT.
U-238	1.118E+00	FAIL ABUN
NP-239	9.959E-02	NOT IDENT.
PU-239	1.789E+02	NOT IDENT.
AM-241	1.118E-01	NOT IDENT.
AM-243	3.110E-02	NOT IDENT.
CM-243	5.499E-02	NOT IDENT.
BK-247	4.453E-02	FAIL ABUN
CM-247	2.060E-02	NOT IDENT.
CF-251	6.851E-02	NOT IDENT.
ANH-511	4.054E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 06:22:14.19

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313910.CNF;1  *
* Acquisition date : 28-FEB-2023 05:21:28 Sensitivity     : 3.000       *
* Detector ID      : GAM33                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.75     Half life ratio : *****       *
* Sample date      :  8-FEB-2023 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1205313910          Analyst initials: RXF2        *
* Batch Number     : 2379916              Sample Quantity : 1.3748E+02 GRAM  *
*                                         Quantity Err(%) : 1.4548E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUL-2022 07:37:58 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;15        *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CO-57	3.102E-02	2.386E-02	2.386E-02
BR-77	1.249E+01	3.566E+01	3.566E+01
SB-122	9.223E+00	6.539E+00	6.539E+00
PM-147	8.978E+02	6.905E+02	6.905E+02
CF-249	3.112E-02	4.066E-02	4.066E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.251E-01	1.622E-01	1.717E-01	NOT IDENT.
NA-22	6.154E-03	2.065E-02	2.084E-02	NOT IDENT.
NA-24	1.380E+08	1.779E+08	1.885E+08	SHORT HLIF
AL-26	-4.438E-04	1.682E-02	1.682E-02	NOT IDENT.
K-40	-1.146E-01	3.180E-01	3.222E-01	NOT IDENT.
SC-46	-8.367E-04	2.084E-02	2.085E-02	NOT IDENT.
V-48	-8.054E-03	4.163E-02	4.179E-02	NOT IDENT.
CR-51	-1.076E-01	2.128E-01	2.182E-01	NOT IDENT.
MN-52	-6.219E-02	1.220E-01	1.252E-01	NOT IDENT.
MN-54	-3.287E-03	2.384E-02	2.388E-02	NOT IDENT.
CO-56	-3.667E-03	2.231E-02	2.237E-02	NOT IDENT.
MN-56	-1.000E+41	5.372E+41	0.000E+00	SHORT HLIF
CO-58	-2.074E-02	3.184E-02	3.318E-02	NOT IDENT.
FE-59	-1.931E-02	4.344E-02	4.430E-02	NOT IDENT.
CO-60	6.174E-03	1.689E-02	1.712E-02	NOT IDENT.
ZN-65	-2.581E-02	5.164E-02	5.293E-02	NOT IDENT.
GE-68	-6.470E-01	6.888E-01	7.480E-01	NOT IDENT.
AS-73	-9.552E-01	7.090E-01	8.295E-01	NOT IDENT.
AS-74	1.965E-02	8.458E-02	8.505E-02	NOT IDENT.
SE-75	1.594E-03	2.749E-02	2.750E-02	FAIL ABUN
SR-82	-1.753E-01	2.488E-01	2.611E-01	NOT IDENT.
RB-83	8.184E-02	4.474E-02	5.799E-02	FAIL ABUN
RB-84	-1.108E-03	5.058E-02	5.058E-02	NOT IDENT.
KR-85	-5.442E+00	7.839E+00	8.214E+00	NOT IDENT.
SR-85	-3.057E-02	4.382E-02	4.594E-02	NOT IDENT.

RB-86	-2.308E-01	4.833E-01	4.944E-01	NOT IDENT.
Y-88	1.239E-02	3.327E-02	3.374E-02	NOT IDENT.
Y-91	-1.398E+01	1.336E+01	1.477E+01	NOT IDENT.
NB-94	1.010E-02	2.225E-02	2.271E-02	NOT IDENT.
NB-95	-3.637E-03	2.588E-02	2.593E-02	NOT IDENT.
NB-95M	-5.293E-02	7.463E-02	7.835E-02	NOT IDENT.
ZR-95	3.779E-02	5.048E-02	5.328E-02	NOT IDENT.
NB-97	-1.000E+41	7.287E+41	0.000E+00	SHORT HLIF
ZR-97	-4.635E+08	2.487E+08	3.248E+08	SHORT HLIF
MO-99	-1.491E+01	2.908E+01	2.984E+01	NOT IDENT.
TC-99M	8.167E+21	2.893E+22	0.000E+00	SHORT HLIF
RH-101	-3.026E-03	1.740E-02	1.745E-02	NOT IDENT.
RH-102	7.350E-03	3.749E-02	3.764E-02	NOT IDENT.
RU-103	-8.483E-06	2.556E-02	2.556E-02	NOT IDENT.
RH-106	5.045E-02	2.671E-01	2.680E-01	NOT IDENT.
RU-106	5.045E-02	2.671E-01	2.680E-01	NOT IDENT.
AG-108M	5.306E-03	2.153E-02	2.166E-02	NOT IDENT.
CD-109	5.644E-01	4.816E-01	5.447E-01	NOT IDENT.
AG-110	4.153E-02	4.068E-01	4.073E-01	NOT IDENT.
AG-110M	-1.562E-03	3.296E-02	3.297E-02	NOT IDENT.
SN-113	1.130E-03	3.336E-02	3.336E-02	NOT IDENT.
CD-115	-1.412E+01	3.275E+01	3.336E+01	NOT IDENT.
SN-117M	-1.347E-03	3.437E-02	3.437E-02	NOT IDENT.
TE-123M	-4.746E-03	1.406E-02	1.422E-02	NOT IDENT.
SB-124	-1.576E-02	3.093E-02	3.173E-02	NOT IDENT.
SB-125	-2.145E-02	5.197E-02	5.286E-02	NOT IDENT.
TE-125M	-2.214E+00	5.851E+00	5.935E+00	NOT IDENT.
I-126	-1.042E-01	2.375E-01	2.421E-01	FAIL ABUN
SB-126	1.446E-02	5.633E-02	5.671E-02	NOT IDENT.
SN-126	1.644E-02	5.111E-02	5.164E-02	NOT IDENT.
SB-127	2.313E-01	1.889E+00	1.892E+00	NOT IDENT.
I-131	-1.977E-02	1.195E-01	1.198E-01	NOT IDENT.
I-132	1.000E+41	2.548E+41	0.000E+00	SHORT HLIF
TE-132	-6.594E-01	1.176E+00	1.213E+00	NOT IDENT.
BA-133	-5.815E-03	2.274E-02	2.289E-02	NOT IDENT.
I-133	3.459E+04	2.084E+05	2.090E+05	SHORT HLIF
CS-134	-2.042E-02	2.355E-02	2.528E-02	FAIL ABUN
I-135	-4.043E+20	1.301E+21	0.000E+00	SHORT HLIF
CS-136	5.671E-03	9.740E-02	9.743E-02	NOT IDENT.
BA-137M	-4.086E-03	2.285E-02	2.292E-02	NOT IDENT.
CS-137	-4.316E-03	2.414E-02	2.421E-02	NOT IDENT.
LA-138	-1.177E-05	2.139E-02	2.139E-02	NOT IDENT.
CE-139	-4.003E-03	1.902E-02	1.911E-02	NOT IDENT.
BA-140	2.307E-02	2.209E-01	2.212E-01	NOT IDENT.
LA-140	-2.970E-03	1.082E-01	1.082E-01	NOT IDENT.
CE-141	-1.492E-02	4.101E-02	4.156E-02	NOT IDENT.
CE-143	-1.377E+02	7.869E+02	7.893E+02	SHORT HLIF
CE-144	8.057E-02	1.141E-01	1.197E-01	NOT IDENT.
PM-144	5.878E-03	2.024E-02	2.041E-02	NOT IDENT.
PR-144	4.411E-01	1.519E+00	1.532E+00	NOT IDENT.
PM-146	1.384E-02	2.517E-02	2.593E-02	FAIL ABUN
ND-147	1.848E-01	4.593E-01	4.668E-01	NOT IDENT.
PM-149	-4.033E+01	2.446E+02	2.453E+02	NOT IDENT.
EU-150	8.515E-03	1.691E-02	1.734E-02	NOT IDENT.
EU-152	-3.254E-02	6.071E-02	6.245E-02	FAIL ABUN
GD-153	-3.003E-03	4.721E-02	4.723E-02	NOT IDENT.
EU-154	2.003E-02	5.950E-02	6.018E-02	NOT IDENT.
EU-155	-6.269E-02	6.361E-02	6.961E-02	NOT IDENT.
TB-160	1.846E-02	7.758E-02	7.803E-02	NOT IDENT.
HO-166M	4.026E-02	3.990E-02	4.384E-02	FAIL ABUN
TM-171	9.229E+00	1.410E+01	1.470E+01	NOT IDENT.
HF-172	-3.217E-03	9.483E-02	9.484E-02	NOT IDENT.
LU-172	-7.970E-03	3.906E-02	3.923E-02	FAIL ABUN
LU-176	-4.711E-03	1.410E-02	1.425E-02	NOT IDENT.
HF-181	-6.914E-03	2.801E-02	2.819E-02	NOT IDENT.
TA-182	-3.048E-02	1.005E-01	1.014E-01	NOT IDENT.
RE-183	-7.843E-02	1.701E-01	1.738E-01	NOT IDENT.
RE-184	-2.145E-02	6.611E-02	6.681E-02	NOT IDENT.
W-188	-8.047E-01	3.999E+00	4.016E+00	NOT IDENT.
IR-192	9.210E-03	2.354E-02	2.390E-02	NOT IDENT.
HG-203	2.320E-02	2.656E-02	2.855E-02	NOT IDENT.
TL-204	-1.207E+00	2.679E+00	2.734E+00	NOT IDENT.
BI-207	-1.522E-03	3.638E-02	3.638E-02	NOT IDENT.
TL-208	-2.488E-02	2.654E-02	2.882E-02	NOT IDENT.
BI-210	2.436E+00	4.072E+00	4.218E+00	NOT IDENT.
PB-210	2.436E+00	4.072E+00	4.218E+00	NOT IDENT.
BI-211	-9.986E-02	1.424E-01	1.493E-01	NOT IDENT.
PB-211	-4.116E-01	4.103E-01	4.503E-01	NOT IDENT.

BI-212	2.571E-01	3.227E-01	3.429E-01	NOT IDENT.
PB-212	1.806E-02	5.046E-02	5.111E-02	FAIL ABUN
BI-213	-3.897E-03	5.156E-02	5.159E-02	NOT IDENT.
BI-214	1.665E-03	5.167E-02	5.167E-02	NOT IDENT.
PB-214	-2.497E-02	5.226E-02	5.346E-02	NOT IDENT.
RN-219	1.116E-01	2.420E-01	2.472E-01	NOT IDENT.
RN-222	1.665E-03	5.167E-02	5.167E-02	NOT IDENT.
RA-223	2.425E-01	3.793E-01	3.948E-01	FAIL ABUN
RA-224	8.672E-02	3.780E-01	3.800E-01	NOT IDENT.
AC-225	-4.595E-03	4.850E-01	4.850E-01	NOT IDENT.
RA-226	-2.497E-02	5.226E-02	5.346E-02	NOT IDENT.
AC-227	3.293E-02	1.466E-01	1.473E-01	NOT IDENT.
TH-227	3.293E-02	1.466E-01	1.473E-01	NOT IDENT.
AC-228	-4.637E-02	1.054E-01	1.075E-01	NOT IDENT.
RA-228	-4.637E-02	1.054E-01	1.075E-01	NOT IDENT.
TH-228	1.806E-02	5.046E-02	5.111E-02	FAIL ABUN
TH-229	5.301E-01	4.882E-01	5.436E-01	FAIL ABUN
TH-230	-2.497E-02	5.226E-02	5.346E-02	NOT IDENT.
PA-231	1.734E-01	2.411E-01	2.534E-01	FAIL ABUN
TH-231	2.425E-01	3.793E-01	3.948E-01	FAIL ABUN
TH-232	-4.637E-02	1.054E-01	1.075E-01	NOT IDENT.
PA-233	1.776E-02	4.159E-02	4.235E-02	NOT IDENT.
PA-234	7.114E-02	2.053E-01	2.078E-01	NOT IDENT.
PA-234M	-8.298E-01	3.161E+00	3.183E+00	NOT IDENT.
TH-234	-8.452E-02	1.115E+00	1.115E+00	FAIL ABUN
U-234	-2.497E-02	5.226E-02	5.346E-02	NOT IDENT.
U-235	-8.939E-02	1.388E-01	1.445E-01	FAIL ABUN
NP-237	1.776E-02	4.159E-02	4.235E-02	NOT IDENT.
NP-238	9.790E+00	4.403E+01	4.425E+01	NOT IDENT.
U-238	-8.452E-02	1.115E+00	1.115E+00	FAIL ABUN
NP-239	-5.541E-02	1.280E-01	1.304E-01	NOT IDENT.
PU-239	8.235E+01	1.974E+02	2.009E+02	NOT IDENT.
AM-241	5.580E-02	1.182E-01	1.208E-01	NOT IDENT.
AM-243	2.663E-02	3.236E-02	3.452E-02	NOT IDENT.
CM-243	3.630E-02	5.806E-02	6.032E-02	NOT IDENT.
BK-247	2.472E-02	4.999E-02	5.121E-02	FAIL ABUN
CM-247	8.739E-03	2.190E-02	2.225E-02	NOT IDENT.
CF-251	-1.755E-02	8.514E-02	8.551E-02	NOT IDENT.
ANH-511	-9.910E-02	4.298E-02	6.199E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	21.9474	85.43	27.0647	131.20	28.8410
45.60	23.0596	86.55	27.1133	133.02	23.1238
46.54	18.0867	86.79	27.1235	133.52	16.1963
49.72	27.3289	86.94	30.3857	136.00	20.8856
51.35	15.2379	87.09	31.4785	136.47	13.9316
51.87	14.2383	87.57	27.5193	140.51	15.1642
52.39	11.2000	88.03	17.3932	143.76	26.9296
52.97	17.3309	88.34	20.3020	144.24	25.7729
53.44	22.4510	88.47	30.4592	145.44	24.6350
54.07	15.3282	89.96	37.7992	152.43	23.6459
57.36	0.0000	90.64	28.3794	153.25	18.9338
57.53	20.5865	91.11	28.3998	154.21	11.8460
57.98	25.7568	92.59	28.4645	156.02	18.9910
59.27	19.6267	93.35	28.4974	158.56	14.2824
59.32	19.6286	94.56	28.5494	159.00	15.4798
59.54	19.6373	94.65	28.5533	162.33	19.1196
60.96	34.2040	94.67	28.5541	162.66	19.1262
61.17	36.2920	94.87	14.6475	163.33	20.3359
62.93	19.7696	97.43	17.6442	165.86	23.9880
63.29	17.7010	98.43	14.3570	176.31	23.0325
63.58	20.8363	98.44	14.3572	176.60	19.4014
64.28	30.2535	99.53	14.3801	177.52	25.4877
66.73	18.8656	100.11	22.1419	181.07	27.6070
67.24	19.9327	102.03	19.9829	181.52	21.1205
67.68	15.7492	103.18	14.4558	184.41	18.3289
67.75	15.7512	103.37	15.5721	185.72	18.3522
68.89	15.7845	105.21	30.1099	193.51	18.4884
69.67	17.9148	105.31	30.1140	197.03	24.7321
70.82	21.1201	106.12	18.9822	198.01	16.5031
70.83	21.1206	106.47	17.8744	201.83	14.9048
72.81	28.6142	109.28	23.5513	203.43	17.4143
72.87	28.6171	111.00	25.8550	205.31	19.9358
74.66	15.9486	111.76	24.7562	210.85	15.8606
74.82	15.9531	114.06	27.0903	215.65	15.9275
74.97	23.4040	116.30	20.3780	218.12	19.3220
77.11	26.6941	116.74	16.9915	222.11	15.1734
78.74	36.4046	119.76	18.1957	227.09	19.4701
79.69	22.5213	121.12	17.0883	227.38	20.3215
80.03	17.1687	121.22	17.0905	228.16	19.4877
80.12	15.0250	121.78	15.2024	228.18	19.4879
80.19	15.0268	122.06	15.2078	235.69	20.4619
80.57	16.1103	122.92	16.7470	235.96	20.4666
81.00	20.4210	123.07	16.7501	238.63	19.2290
81.07	19.3484	123.68	12.1913	238.98	19.2345
81.75	23.6748	125.81	16.0441	240.99	12.8439
82.47	25.8578	127.23	20.6644	242.00	16.7106
83.79	16.1959	127.91	20.6820	244.70	12.0233
84.00	14.0412	129.30	19.5663	252.40	16.4166

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	16.4219	351.06	13.8760	569.33	7.7612
254.15	0.0000	351.93	12.9578	569.50	7.7618
256.23	14.7324	355.39	0.0000	569.70	7.7625
260.90	14.7854	356.01	11.1348	583.19	10.4102
264.66	14.6532	364.49	14.9229	584.27	8.3317
264.80	14.6545	366.42	10.2713	595.83	10.4659
265.00	11.7779	372.51	9.3715	600.60	10.4867
269.46	14.0055	375.05	10.3241	602.52	0.0000
270.03	14.4492	377.52	8.4593	604.72	8.4036
271.23	19.7214	383.85	8.4906	607.14	11.5667
273.65	14.4882	388.16	14.1861	609.32	6.3147
276.40	13.1976	388.63	14.1901	610.33	4.2116
277.37	7.9243	391.69	12.7933	614.28	6.3276
277.60	7.9255	400.66	11.4299	618.01	14.7873
278.00	13.2132	401.81	8.5779	620.36	13.7443
279.20	13.2248	402.40	8.5807	621.93	12.6948
279.54	13.2278	404.85	12.4113	630.19	0.0000
279.70	13.2297	410.95	10.5374	631.29	6.3716
280.46	13.2367	413.71	6.7159	633.25	11.1588
283.69	13.2678	414.70	6.7196	634.78	9.5706
284.31	13.2736	423.72	8.6818	635.95	3.1917
285.41	13.2840	427.09	9.6639	636.99	3.8316
285.90	13.2889	427.87	10.6348	657.50	5.3648
287.50	10.6431	433.94	10.6692	657.76	5.3654
290.67	11.7337	439.40	11.6729	657.90	0.0000
293.27	0.0000	440.45	6.8129	661.66	8.5977
295.22	13.3765	453.88	6.8604	664.57	0.0000
295.96	9.8146	463.37	7.8786	666.33	15.0732
298.58	17.8772	468.07	12.8328	666.50	15.0738
299.98	12.5263	473.00	11.8750	667.71	0.0000
300.09	12.5271	475.06	7.9248	677.62	10.8130
300.13	11.6326	476.78	4.9572	685.70	5.4232
301.36	7.1647	477.60	7.9347	692.65	8.6995
302.85	13.4476	482.18	7.4556	695.00	5.4421
304.50	11.6678	487.02	8.9680	696.49	5.4451
304.85	9.8750	492.35	8.9912	696.51	5.4451
306.78	12.5847	497.08	8.0104	697.00	5.4462
308.46	9.8994	505.52	12.0640	697.30	4.3574
311.90	10.8242	507.63	0.0000	697.49	4.3577
316.51	10.8577	511.00	26.2060	702.65	6.5491
319.41	11.9665	514.00	38.3556	706.68	8.7451
320.08	11.7904	514.00	38.3556	711.68	8.2135
321.04	11.7979	520.40	3.0371	720.70	1.0988
323.87	10.0014	520.69	3.0375	721.93	0.0000
325.23	21.8408	522.65	0.0000	722.78	7.6970
328.76	17.3301	527.90	9.1428	722.91	7.6976
333.37	16.4670	1093.63	9.1443	723.31	5.4991
333.97	11.8974	529.59	7.1165	724.19	4.4006
334.37	11.9003	529.87	0.0000	727.33	4.4056
338.28	15.6010	531.02	6.1040	733.00	6.6218
338.32	15.6013	537.26	8.1618	735.93	7.7337
340.48	11.0278	546.56	0.0000	737.46	5.5269
340.55	11.0283	552.55	10.2722	739.50	8.8496
344.28	16.5813	563.25	8.2568	744.23	7.7565
345.93	13.8318	564.24	8.2601	747.24	8.8740

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	6.6575	954.55	0.0000	1408.01	2.9868
752.31	5.5562	962.31	4.2775	1434.09	1.0012
753.82	10.0063	964.08	5.3496	1435.80	1.0015
756.73	4.4518	966.17	8.0294	1457.56	0.0000
756.80	4.4520	968.97	5.3571	1460.82	3.0203
763.94	5.5788	983.53	3.5864	1489.16	3.0381
765.81	6.6990	984.45	1.7937	1505.03	1.0160
766.42	4.4668	996.26	5.3990	1584.12	3.0965
766.84	3.3506	1001.03	3.6042	1596.21	5.1730
772.60	0.0000	1002.74	5.4089	1620.50	3.1185
776.52	8.9648	1004.73	9.9221	1621.92	3.1192
777.92	5.6057	1021.30	0.0000	1678.03	0.0000
778.90	1.1215	1025.87	4.5367	1690.97	1.0534
783.70	1.6851	1028.54	1.8160	1750.46	0.0000
788.74	5.0638	1037.84	4.5517	1764.49	3.2029
792.07	2.2531	1038.76	0.0000	1770.23	1.0687
795.86	7.8961	1046.59	4.5624	1771.35	3.2067
801.95	7.9120	1048.07	6.3901	1791.20	0.0000
810.06	14.7340	1049.04	4.5654	1808.65	1.0760
810.29	14.7350	1050.41	4.5673	1810.72	0.0000
810.45	14.7356	1063.66	3.6670	1836.06	2.1624
810.76	11.3363	1077.00	4.5999		
815.77	7.9485	1077.34	6.4407		
818.51	6.8193	1085.87	5.5331		
832.01	5.7078	1093.63	5.5444		
834.85	6.8557	1099.45	3.7019		
835.71	3.4288	1112.07	3.7141		
836.80	0.0000	1112.84	4.6436		
846.75	0.0000	1115.54	6.5052		
846.77	4.5881	1120.29	2.7914		
856.80	8.0550	1120.55	2.7916		
860.56	2.3042	1121.30	3.7229		
871.09	1.1559	1129.67	7.4619		
873.19	6.9399	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	3.4767	1173.23	1.8861		
880.51	5.7965	1177.95	0.0000		
881.60	5.7985	1189.05	0.9467		
883.24	2.3206	1204.77	8.5534		
884.68	5.8040	1221.41	4.7711		
889.28	3.4874	1231.02	2.8693		
894.76	6.9866	1235.36	4.7873		
898.04	5.8280	1238.28	1.9161		
900.72	5.8329	1260.41	0.0000		
903.28	4.3781	1271.87	1.9314		
911.20	6.1440	1274.44	1.9326		
912.08	6.1457	1274.54	1.9326		
923.98	3.5244	1291.59	1.9403		
926.50	5.2906	1298.22	0.0000		
929.11	2.6474	1312.11	0.9747		
935.54	8.8416	1332.49	0.9792		
937.49	6.1927	1362.66	0.0000		
944.13	3.5457	1365.19	5.9180		
946.00	4.4345	1368.63	0.0000		
949.00	5.3262	1384.29	0.9905		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:51:29.38

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GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313911.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM03.CNF;669
Background date : 26-FEB-2023 09:12:40
Sample date : 20-JAN-2023 11:00:00 Acquisition date : 28-FEB-2023 06:51:01
Sample ID : G1205313911 Sample quantity : 9.68100E+01 GRAM
Detector name : GAM03 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.33 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : RXF2
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2379916 Detector SN# :
Matrix Spike ID : LCS ID :

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.84*	21	100	1.56	125.29	119	12	5.80E-03	101.9	
2	3	74.57	64	95	1.73	148.73	143	17	1.77E-02	32.8	1.95E+00
3	3	77.32	72	80	1.44	154.23	143	17	1.99E-02	27.1	
4	0	92.47*	16	142	1.27	184.51	179	12	4.39E-03	166.6	
5	0	111.91*	37	92	3.74	223.39	217	13	1.03E-02	56.4	
6	0	185.94*	26	50	1.29	371.38	366	10	7.28E-03	62.2	
7	0	211.29	57	65	6.29	422.06	415	16	1.59E-02	33.9	
8	1	238.61*	174	36	1.66	476.68	468	22	4.83E-02	10.8	2.17E+00
9	1	241.61	54	29	1.74	482.68	468	22	1.50E-02	30.9	
10	0	294.96*	70	51	1.37	589.34	583	12	1.95E-02	24.0	
11	0	328.73	34	25	1.15	656.86	651	13	9.43E-03	35.3	
12	0	338.35*	34	25	1.79	676.09	672	9	9.50E-03	33.9	
13	0	351.70*	90	46	1.15	702.77	696	11	2.50E-02	16.9	
14	0	376.94	20	33	3.30	753.24	743	15	5.57E-03	66.8	
15	2	413.70	20	8	2.15	826.75	803	33	5.52E-03	42.3	1.66E+00
16	2	416.90	16	3	1.45	833.15	803	33	4.31E-03	28.6	
17	0	422.06	28	12	5.41	843.46	837	15	7.85E-03	32.1	
18	0	510.53*	15	37	2.13	1020.37	1013	16	4.11E-03	115.2	
19	0	553.56	17	15	1.22	1106.40	1100	13	4.84E-03	52.8	
20	0	583.13*	49	15	1.41	1165.53	1159	12	1.37E-02	22.6	
21	0	608.81*	94	20	2.18	1216.88	1211	13	2.62E-02	14.6	
22	0	645.71	6	9	0.53	1290.67	1285	12	1.57E-03	114.4	
23	0	676.61	13	14	4.42	1352.46	1345	16	3.67E-03	65.5	
24	0	726.65	9	12	2.29	1452.53	1447	9	2.60E-03	72.7	
25	0	741.34	14	7	0.77	1481.90	1477	9	3.95E-03	42.3	
26	0	768.92	11	24	1.07	1537.07	1529	14	2.94E-03	103.8	
27	0	872.49	5	12	0.99	1744.20	1736	12	1.39E-03	145.6	
28	0	902.96	5	7	0.92	1805.13	1798	9	1.48E-03	97.8	
29	0	910.97*	18	11	0.92	1821.17	1813	11	5.06E-03	45.2	
30	0	934.61	6	8	0.86	1868.44	1861	11	1.68E-03	100.4	
31	0	953.74	15	3	0.59	1906.71	1899	14	4.06E-03	37.6	
32	0	970.09	11	17	0.97	1939.40	1931	13	3.18E-03	78.4	
33	0	1001.22*	12	16	0.55	2001.68	1993	20	3.38E-03	87.2	
34	0	1099.16	12	6	1.10	2197.56	2190	12	3.33E-03	50.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1153.37	4	9	1.37	2306.00	2300	9	1.11E-03	144.2	
36	5	1179.04	17	0	2.87	2357.36	2352	13	4.68E-03	25.2	6.56E-01
37	5	1181.35	9	0	1.78	2361.98	2352	13	2.39E-03	32.8	
38	0	1225.73	4	7	0.55	2450.75	2443	10	1.10E-03	137.9	
39	0	1236.77	20	12	0.91	2472.84	2464	16	5.59E-03	44.4	
40	0	1460.06*	173	0	2.09	2919.54	2912	15	4.81E-02	7.7	
41	0	1763.31	24	0	1.75	3526.29	3517	14	6.67E-03	20.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 07:51:30

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313911.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 20-JAN-2023 11:00:00	Acquisition date	: 28-FEB-2023 06:51:01
Sample ID	: G1205313911	Sample quantity	: 96.810 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA3	Detector geometry	: CAN
Elapsed live time	: 0 01:00:00.00	Elapsed real time	: 0 01:00:00.33 0.0%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	162	10.66*	1.013E+00	1.160E+01	1.160E+01	15.48
TL-208	277.37	------	6.60	3.962E+00	------ Line Not Found		------
	583.19	46	85.00*	2.224E+00	1.899E-01	1.899E-01	45.29
	860.56	------	12.50	1.600E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.165E+00	------ Line Not Found		------
	351.06	85	12.92*	3.309E+00	1.547E+00	1.547E+00	33.78
BI-212	727.33	9	6.67*	1.853E+00	5.514E-01	5.514E-01	145.46
	1620.50	------	1.47	9.391E-01	------ Line Not Found		------
PB-212	74.82	61	10.28	3.355E+00	1.374E+00	1.374E+00	65.69
	77.11	69	17.10	3.648E+00	8.556E-01	8.556E-01	54.29
	238.63	165	43.60*	4.422E+00	6.636E-01	6.636E-01	21.50
	300.09	------	3.30	3.734E+00	------ Line Not Found		------
BI-214	609.32	89	45.49*	2.147E+00	7.048E-01	7.048E-01	29.13
	1120.29	------	14.92	1.267E+00	------ Line Not Found		------
	1764.49	22	15.30	8.908E-01	1.270E+00	1.271E+00	40.82
PB-214	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.415E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.615E-01	33.78
RN-222	609.32	89	45.49*	2.147E+00	7.048E-01	7.048E-01	29.13
	1120.29	------	14.92	1.267E+00	------ Line Not Found		------
	1764.49	22	15.30	8.908E-01	1.270E+00	1.271E+00	40.82
RA-224	240.99	51	4.10*	4.383E+00	2.214E+00	2.214E+00	61.87
RA-226	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.415E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.615E-01	33.78
AC-228	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
RA-228	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
TH-228	74.82	61	10.28	3.355E+00	1.374E+00	1.374E+00	65.69
	77.11	69	17.10	3.648E+00	8.556E-01	8.556E-01	54.29
	238.63	165	43.60*	4.422E+00	6.636E-01	6.636E-01	21.50
	300.09	------	3.30	3.734E+00	------ Line Not Found		------
TH-230	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	295.22	67	18.42	3.783E+00	7.414E-01	7.414E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.614E-01	33.78
TH-232	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
TH-234	63.29	20	3.70*	1.976E+00	2.132E+00	2.132E+00	203.87
	92.59	15	4.23	4.910E+00	5.652E-01	5.652E-01	333.22
U-234	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.414E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.614E-01	33.78
U-238	63.29	20	3.70*	1.976E+00	2.132E+00	2.132E+00	203.87
	92.59	15	4.23	4.910E+00	5.652E-01	5.652E-01	333.22
AM-243	43.53	------	5.90	2.343E-01	------ Line Not Found		------
	74.66	61	67.20*	3.355E+00	2.102E-01	2.102E-01	65.69
ANH-511	511.00	14	100.00*	2.475E+00	4.368E-02	4.368E-02	230.37

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:51:31.49

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313911.CNF;1		
Acquisition date	: 28-FEB-2023 06:51:01	Sensitivity	: 3.000
Detector ID	: GAM03	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.33	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Analyst initials	: RXF2
Sample ID	: G1205313911	Sample Quantity	: 9.6810E+01 GRAM
Batch Number	: 2379916	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	: 12-OCT-2022 09:50:42	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;29		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.160E+01	1.760E+00	8.566E-01
TL-208	1.899E-01	8.429E-02	8.546E-02
BI-211	1.547E+00	5.121E-01	5.618E-01
BI-212	5.514E-01	7.860E-01	1.454E+00
PB-212	6.636E-01	1.398E-01	1.151E-01
BI-214	7.048E-01	2.012E-01	1.874E-01
PB-214	5.615E-01	1.858E-01	1.769E-01
RN-222	7.048E-01	2.012E-01	1.874E-01
RA-224	2.214E+00	1.343E+00	1.234E+00
RA-226	5.615E-01	1.858E-01	1.769E-01
AC-228	3.367E-01	2.985E-01	3.715E-01
RA-228	3.367E-01	2.985E-01	3.715E-01
TH-228	6.636E-01	1.398E-01	1.151E-01
TH-230	5.614E-01	1.858E-01	1.769E-01
TH-232	3.367E-01	2.985E-01	3.715E-01
TH-234	2.132E+00	4.260E+00	3.763E+00
U-234	5.614E-01	1.858E-01	1.769E-01
U-238	2.132E+00	4.260E+00	3.763E+00
AM-243	2.102E-01	1.353E-01	1.281E-01
ANH-511	4.368E-02	9.861E-02	6.942E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	5.902E-02	4.881E-01	9.722E-01	NOT IDENT.
NA-22	-1.211E-02	5.741E-02	1.104E-01	NOT IDENT.
NA-24	0.000E+00	2.397E+17	0.000E+00	SHORT HLIF
AL-26	6.785E-03	4.745E-02	1.052E-01	NOT IDENT.
SC-46	-2.690E-03	7.544E-02	1.404E-01	NOT IDENT.
V-48	-7.087E-02	2.942E-01	5.290E-01	NOT IDENT.
CR-51	-4.529E-01	8.734E-01	1.459E+00	NOT IDENT.
MN-52	6.460E+00	6.045E+00	1.534E+01	FAIL ABUN
MN-54	4.250E-02	4.428E-02	1.012E-01	NOT IDENT.
CO-56	-4.625E-02	5.905E-02	9.479E-02	NOT IDENT.

MN-56	0.000E+00	1.286E+41	0.000E+00	SHORT HLIF
CO-57	-3.305E-02	3.038E-02	5.009E-02	NOT IDENT.
CO-58	-2.510E-02	5.962E-02	1.059E-01	NOT IDENT.
FE-59	2.189E-01	2.146E-01	4.061E-01	FAIL ABUN
CO-60	5.080E-02	4.671E-02	1.190E-01	NOT IDENT.
ZN-65	-9.803E-02	1.316E-01	2.264E-01	NOT IDENT.
GE-68	1.776E+00	1.666E+00	3.959E+00	NOT IDENT.
AS-73	9.150E-01	2.261E+00	3.984E+00	NOT IDENT.
AS-74	-3.396E-01	3.116E-01	4.914E-01	NOT IDENT.
SE-75	3.228E-02	6.180E-02	1.186E-01	NOT IDENT.
BR-77	0.000E+00	2.198E+04	0.000E+00	SHORT HLIF
SR-82	-3.700E-01	7.689E-01	1.349E+00	NOT IDENT.
RB-83	8.389E-03	1.070E-01	2.089E-01	FAIL ABUN
RB-84	4.490E-02	1.679E-01	3.317E-01	NOT IDENT.
KR-85	7.601E+00	1.067E+01	1.993E+01	NOT IDENT.
SR-85	5.160E-02	7.255E-02	1.355E-01	NOT IDENT.
RB-86	2.616E+00	2.279E+00	5.540E+00	NOT IDENT.
Y-88	2.266E-02	4.647E-02	1.237E-01	NOT IDENT.
Y-91	1.281E+00	2.411E+01	5.191E+01	NOT IDENT.
NB-94	-8.486E-03	4.854E-02	8.897E-02	FAIL ABUN
NB-95	-3.064E-02	8.242E-02	1.326E-01	NOT IDENT.
NB-95M	2.841E-01	1.998E-01	4.042E-01	NOT IDENT.
ZR-95	-7.695E-02	1.294E-01	2.206E-01	NOT IDENT.
NB-97	0.000E+00	1.400E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.306E+16	0.000E+00	SHORT HLIF
MO-99	0.000E+00	8.615E+03	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	1.969E-02	3.814E-02	7.296E-02	NOT IDENT.
RH-102	-2.634E-02	7.455E-02	1.347E-01	NOT IDENT.
RU-103	-3.445E-02	7.488E-02	1.351E-01	NOT IDENT.
RH-106	-1.864E-02	4.045E-01	7.763E-01	NOT IDENT.
RU-106	-1.864E-02	4.045E-01	7.763E-01	NOT IDENT.
AG-108M	-3.156E-03	3.614E-02	6.907E-02	NOT IDENT.
CD-109	1.955E-01	1.215E+00	2.036E+00	NOT IDENT.
AG-110	1.070E+00	1.076E+00	2.326E+00	NOT IDENT.
AG-110M	3.809E-02	8.449E-02	1.692E-01	FAIL ABUN
SN-113	1.018E-02	6.750E-02	1.313E-01	NOT IDENT.
CD-115	0.000E+00	2.176E+04	0.000E+00	SHORT HLIF
SN-117M	-1.400E-01	2.350E-01	4.028E-01	NOT IDENT.
SB-122	0.000E+00	1.064E+03	0.000E+00	SHORT HLIF
TE-123M	-1.793E-02	4.067E-02	7.079E-02	NOT IDENT.
SB-124	2.487E-02	1.251E-01	2.975E-01	NOT IDENT.
SB-125	-1.118E-02	1.071E-01	1.826E-01	NOT IDENT.
TE-125M	2.858E+00	1.685E+01	2.851E+01	NOT IDENT.
I-126	-3.911E-02	9.432E-01	1.809E+00	NOT IDENT.
SB-126	-1.279E-01	6.576E-01	1.073E+00	FAIL ABUN
SN-126	-5.372E-03	1.157E-01	1.902E-01	FAIL ABUN
SB-127	0.000E+00	1.318E+02	0.000E+00	SHORT HLIF
I-131	-6.546E-01	1.328E+00	2.203E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.445E+02	0.000E+00	SHORT HLIF
BA-133	2.632E-02	5.973E-02	1.032E-01	NOT IDENT.
I-133	0.000E+00	1.277E+12	0.000E+00	SHORT HLIF
CS-134	2.368E-02	6.251E-02	1.249E-01	NOT IDENT.
I-135	0.000E+00	1.270E+41	0.000E+00	SHORT HLIF
CS-136	-5.833E-03	4.550E-01	9.214E-01	FAIL ABUN
BA-137M	-1.762E-02	5.071E-02	9.095E-02	NOT IDENT.
CS-137	-1.862E-02	5.357E-02	9.608E-02	NOT IDENT.
LA-138	5.194E-02	7.331E-02	1.765E-01	NOT IDENT.
CE-139	-1.833E-02	3.729E-02	6.472E-02	NOT IDENT.
BA-140	-4.903E-01	1.271E+00	2.303E+00	NOT IDENT.
LA-140	-1.516E-01	3.480E-01	6.510E-01	FAIL ABUN
CE-141	6.227E-02	1.351E-01	2.534E-01	NOT IDENT.
CE-143	0.000E+00	2.887E+07	0.000E+00	SHORT HLIF
CE-144	7.638E-02	2.596E-01	4.854E-01	NOT IDENT.
PM-144	-3.477E-03	4.994E-02	9.348E-02	NOT IDENT.
PR-144	-2.236E-01	3.791E+00	7.106E+00	NOT IDENT.
PM-146	-3.863E-02	5.398E-02	9.383E-02	NOT IDENT.
ND-147	-1.393E+00	3.355E+00	6.049E+00	FAIL ABUN
PM-147	-3.095E+02	8.968E+02	1.599E+03	NOT IDENT.
PM-149	0.000E+00	2.021E+05	0.000E+00	SHORT HLIF
EU-150	2.768E-02	4.634E-02	6.778E-02	FAIL ABUN
EU-152	2.250E-02	1.509E-01	2.708E-01	NOT IDENT.
GD-153	-1.227E-02	1.275E-01	2.140E-01	NOT IDENT.
EU-154	-3.262E-02	1.610E-01	3.101E-01	FAIL ABUN
EU-155	-3.560E-02	1.296E-01	2.332E-01	NOT IDENT.
TB-160	-9.943E-02	2.231E-01	3.896E-01	FAIL ABUN
HO-166M	-1.484E-02	7.430E-02	1.383E-01	NOT IDENT.

TM-171	-3.831E+01	4.335E+01	6.574E+01	NOT IDENT.
HF-172	9.610E-02	2.286E-01	4.352E-01	FAIL ABUN
LU-172	-3.121E-02	9.528E-02	1.523E-01	FAIL ABUN
LU-176	1.340E-02	3.139E-02	6.016E-02	NOT IDENT.
HF-181	2.080E-02	8.340E-02	1.655E-01	NOT IDENT.
TA-182	-7.045E-02	3.123E-01	5.069E-01	NOT IDENT.
RE-183	1.600E-01	4.624E-01	8.194E-01	NOT IDENT.
RE-184	1.419E-01	2.718E-01	5.243E-01	FAIL ABUN
W-188	-6.944E+00	1.351E+01	1.972E+01	FAIL ABUN
IR-192	2.083E-02	5.598E-02	1.054E-01	FAIL ABUN
HG-203	1.153E-04	7.068E-02	1.267E-01	NOT IDENT.
TL-204	-2.857E+00	7.827E+00	1.262E+01	NOT IDENT.
BI-207	0.000E+00	6.443E-02	1.305E-01	FAIL ABUN
BI-210	-4.689E+00	1.029E+01	1.672E+01	NOT IDENT.
PB-210	-4.689E+00	1.029E+01	1.672E+01	NOT IDENT.
PB-211	2.826E-01	9.108E-01	1.650E+00	NOT IDENT.
BI-213	4.194E-03	1.416E-01	2.712E-01	NOT IDENT.
RN-219	-8.543E-02	5.013E-01	8.367E-01	NOT IDENT.
RA-223	8.499E-02	8.702E-01	1.423E+00	FAIL ABUN
AC-225	-9.374E-01	3.974E+00	6.632E+00	NOT IDENT.
AC-227	-1.138E-01	3.317E-01	5.724E-01	NOT IDENT.
TH-227	-1.138E-01	3.317E-01	5.724E-01	NOT IDENT.
TH-229	-4.469E-01	6.013E-01	1.005E+00	FAIL ABUN
PA-231	3.915E-01	6.720E-01	1.270E+00	NOT IDENT.
TH-231	8.499E-02	8.702E-01	1.423E+00	FAIL ABUN
PA-233	3.255E-02	8.264E-02	1.561E-01	NOT IDENT.
PA-234	3.246E-01	4.033E-01	8.551E-01	FAIL ABUN
PA-234M	7.502E+00	1.282E+01	1.501E+01	FAIL ABUN
U-235	-1.657E-01	2.748E-01	4.776E-01	FAIL ABUN
NP-237	3.255E-02	8.264E-02	1.561E-01	NOT IDENT.
NP-238	0.000E+00	6.658E+04	0.000E+00	SHORT HLIF
NP-239	-3.393E-02	3.691E-01	6.019E-01	NOT IDENT.
PU-239	-1.407E+02	4.136E+02	7.336E+02	FAIL ABUN
AM-241	-4.715E-02	2.840E-01	4.734E-01	NOT IDENT.
CM-243	6.640E-02	1.253E-01	2.427E-01	NOT IDENT.
BK-247	6.852E-02	9.573E-02	1.879E-01	NOT IDENT.
CM-247	-1.683E-02	4.652E-02	7.454E-02	NOT IDENT.
CF-249	3.468E-02	5.235E-02	1.073E-01	NOT IDENT.
CF-251	-5.807E-02	1.478E-01	2.582E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:51:30.12

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	162	10.66*	1.013E+00	1.160E+01	1.160E+01	15.48
TL-208	277.37	------	6.60	3.962E+00	------ Line Not Found		------
	583.19	46	85.00*	2.224E+00	1.899E-01	1.899E-01	45.29
	860.56	------	12.50	1.600E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.165E+00	------ Line Not Found		------
	351.06	85	12.92*	3.309E+00	1.547E+00	1.547E+00	33.78
BI-212	727.33	9	6.67*	1.853E+00	5.514E-01	5.514E-01	145.46
	1620.50	------	1.47	9.391E-01	------ Line Not Found		------
PB-212	74.82	61	10.28	3.355E+00	1.374E+00	1.374E+00	65.69
	77.11	69	17.10	3.648E+00	8.556E-01	8.556E-01	54.29
	238.63	165	43.60*	4.422E+00	6.636E-01	6.636E-01	21.50
	300.09	------	3.30	3.734E+00	------ Line Not Found		------
BI-214	609.32	89	45.49*	2.147E+00	7.048E-01	7.048E-01	29.13
	1120.29	------	14.92	1.267E+00	------ Line Not Found		------
	1764.49	22	15.30	8.908E-01	1.270E+00	1.271E+00	40.82
PB-214	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.415E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.615E-01	33.78
RN-222	609.32	89	45.49*	2.147E+00	7.048E-01	7.048E-01	29.13
	1120.29	------	14.92	1.267E+00	------ Line Not Found		------
	1764.49	22	15.30	8.908E-01	1.270E+00	1.271E+00	40.82
RA-224	240.99	51	4.10*	4.383E+00	2.214E+00	2.214E+00	61.87
RA-226	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.415E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.615E-01	33.78
AC-228	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
RA-228	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
TH-228	74.82	61	10.28	3.355E+00	1.374E+00	1.374E+00	65.69
	77.11	69	17.10	3.648E+00	8.556E-01	8.556E-01	54.29
	238.63	165	43.60*	4.422E+00	6.636E-01	6.636E-01	21.50
	300.09	------	3.30	3.734E+00	------ Line Not Found		------
TH-230	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.414E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.614E-01	33.78
TH-232	105.21	------	1.10	5.511E+00	------ Line Not Found		------
	338.32	32	11.27	3.408E+00	6.535E-01	6.535E-01	67.77
	835.71	------	1.61	1.642E+00	------ Line Not Found		------
	911.20	17	25.80*	1.522E+00	3.367E-01	3.367E-01	90.47
	968.97	11	15.80	1.439E+00	3.659E-01	3.659E-01	156.83
TH-234	63.29	20	3.70*	1.976E+00	2.132E+00	2.132E+00	203.87
	92.59	15	4.23	4.910E+00	5.652E-01	5.652E-01	333.22
U-234	74.82	61	5.80	3.355E+00	2.435E+00	2.435E+00	65.69
	77.11	69	9.70	3.648E+00	1.508E+00	1.508E+00	54.29
	87.09	------	3.41	4.534E+00	------ Line Not Found		------
	242.00	51	7.25	4.383E+00	1.252E+00	1.252E+00	61.87
	295.22	67	18.42	3.783E+00	7.414E-01	7.414E-01	48.00
	351.93	85	35.60*	3.309E+00	5.614E-01	5.614E-01	33.78
U-238	63.29	20	3.70*	1.976E+00	2.132E+00	2.132E+00	203.87
	92.59	15	4.23	4.910E+00	5.652E-01	5.652E-01	333.22
AM-243	43.53	------	5.90	2.343E-01	------ Line Not Found		------
	74.66	61	67.20*	3.355E+00	2.102E-01	2.102E-01	65.69
ANH-511	511.00	14	100.00*	2.475E+00	4.368E-02	4.368E-02	230.37

Flag: "*" = Keyline

Sample ID : G1205313911 Acquisition date : 28-FEB-2023 06:51:01

Total number of lines in spectrum 41
Number of unidentified lines 8
Number of lines tentatively identified by NID 33 80.49%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.160E+01	1.160E+01	0.180E+01	15.48	
TL-208	1.41E+10Y	1.00	1.899E-01	1.899E-01	0.860E-01	45.29	
BI-211	7.04E+08Y	1.00	1.547E+00	1.547E+00	0.523E+00	33.78	
BI-212	1.41E+10Y	1.00	5.514E-01	5.514E-01	8.020E-01	145.46	
PB-212	1.41E+10Y	1.00	6.636E-01	6.636E-01	1.427E-01	21.50	
BI-214	1600.00Y	1.00	7.048E-01	7.048E-01	2.053E-01	29.13	
PB-214	1600.00Y	1.00	5.614E-01	5.615E-01	1.896E-01	33.78	
RN-222	1600.00Y	1.00	7.048E-01	7.048E-01	2.053E-01	29.13	
RA-224	1.41E+10Y	1.00	2.214E+00	2.214E+00	1.370E+00	61.87	
RA-226	1600.00Y	1.00	5.614E-01	5.615E-01	1.896E-01	33.78	
AC-228	1.41E+10Y	1.00	3.367E-01	3.367E-01	3.046E-01	90.47	
RA-228	1.41E+10Y	1.00	3.367E-01	3.367E-01	3.046E-01	90.47	
TH-228	1.41E+10Y	1.00	6.636E-01	6.636E-01	1.427E-01	21.50	
TH-230	7.54E+04Y	1.00	5.614E-01	5.614E-01	1.896E-01	33.78	
TH-232	1.41E+10Y	1.00	3.367E-01	3.367E-01	3.046E-01	90.47	
TH-234	4.47E+09Y	1.00	2.132E+00	2.132E+00	4.347E+00	203.87	
U-234	2.45E+05Y	1.00	5.614E-01	5.614E-01	1.896E-01	33.78	
U-238	4.47E+09Y	1.00	2.132E+00	2.132E+00	4.347E+00	203.87	
AM-243	7370.00Y	1.00	2.102E-01	2.102E-01	1.381E-01	65.69	
ANH-511	1.00E+09Y	1.00	4.368E-02	4.368E-02	10.06E-02	230.37	
	Total Activity :		2.661E+01	2.661E+01			
	Grand Total Activity :		2.661E+01	2.661E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1205313911 Acquisition date : 28-FEB-2023 06:51:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	111.91	36	88	3.74	223.39	217	13	1.03E-02	****	5.69E+00	T
0	185.94	25	48	1.29	371.38	366	10	7.28E-03	****	5.20E+00	T
0	211.29	55	61	6.29	422.06	415	16	1.59E-02	67.8	4.81E+00	T
0	328.73	32	24	1.15	656.86	651	13	9.43E-03	70.6	3.48E+00	T
0	376.94	19	31	3.30	753.24	743	15	5.57E-03	****	3.14E+00	T
2	413.70	19	8	2.15	826.75	803	33	5.52E-03	84.6	2.92E+00	T
2	416.90	15	3	1.45	833.15	803	33	4.31E-03	57.2	2.90E+00	
0	422.06	27	11	5.41	843.46	837	15	7.85E-03	64.2	2.87E+00	
0	553.56	16	14	1.22	1106.40	1100	13	4.84E-03	****	2.32E+00	T
0	645.71	5	9	0.53	1290.67	1285	12	1.57E-03	****	2.05E+00	
0	676.61	12	13	4.42	1352.46	1345	16	3.67E-03	****	1.97E+00	T
0	741.34	13	6	0.77	1481.90	1477	9	3.95E-03	84.6	1.82E+00	
0	768.92	10	23	1.07	1537.07	1529	14	2.94E-03	****	1.77E+00	
0	872.49	5	11	0.99	1744.20	1736	12	1.39E-03	****	1.58E+00	T
0	902.96	5	6	0.92	1805.13	1798	9	1.48E-03	****	1.53E+00	T
0	934.61	6	7	0.86	1868.44	1861	11	1.68E-03	****	1.49E+00	T
0	953.74	14	3	0.59	1906.71	1899	14	4.06E-03	75.3	1.46E+00	T
0	1001.22	11	15	0.55	2001.68	1993	20	3.38E-03	****	1.40E+00	T
0	1099.16	11	6	1.10	2197.56	2190	12	3.33E-03	****	1.29E+00	T
0	1153.37	4	8	1.37	2306.00	2300	9	1.11E-03	****	1.23E+00	
5	1179.04	16	0	2.87	2357.36	2352	13	4.68E-03	50.4	1.21E+00	T
5	1181.35	8	0	1.78	2361.98	2352	13	2.39E-03	65.7	1.21E+00	
0	1225.73	4	7	0.55	2450.75	2443	10	1.10E-03	****	1.17E+00	
0	1236.77	19	11	0.91	2472.84	2464	16	5.59E-03	88.9	1.16E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:51:40.91

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313911.CNF;1   *
* Acquisition date : 28-FEB-2023 06:51:01 Sensitivity     : 3.000       *
* Detector ID      : GAM03                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****       *
* Sample date      : 20-JAN-2023 11:00:00 Nuclide Library : SOLID       *
* Sample ID        : G1205313911          Analyst initials: RXF2        *
* Batch Number     : 2379916              Sample Quantity : 9.6810E+01 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 12-OCT-2022 09:50:42 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;29         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.321E-01
TL-208	3.724E-02
BI-211	2.567E-01
BI-212	6.430E-01
PB-212	5.218E-02
BI-214	8.310E-02
PB-214	7.963E-02
RN-222	8.310E-02
RA-224	5.593E-01
RA-226	7.963E-02
AC-228	1.593E-01
RA-228	1.593E-01
TH-228	5.218E-02
TH-230	7.963E-02
TH-232	1.593E-01
TH-234	1.743E+00
U-234	7.963E-02
U-238	1.743E+00
AM-243	5.947E-02
ANH-511	3.052E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	4.229E-01	NOT IDENT.
NA-22	4.577E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.076E-02	NOT IDENT.
SC-46	6.102E-02	NOT IDENT.
V-48	2.251E-01	NOT IDENT.
CR-51	6.517E-01	NOT IDENT.
MN-52	6.421E+00	FAIL ABUN
MN-54	4.373E-02	NOT IDENT.
CO-56	3.832E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF

CO-57	2.275E-02	NOT IDENT.
CO-58	4.389E-02	NOT IDENT.
FE-59	1.769E-01	FAIL ABUN
CO-60	4.986E-02	NOT IDENT.
ZN-65	9.517E-02	NOT IDENT.
GE-68	1.708E+00	NOT IDENT.
AS-73	1.842E+00	NOT IDENT.
AS-74	2.090E-01	NOT IDENT.
SE-75	5.395E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.608E-01	NOT IDENT.
RB-83	9.153E-02	FAIL ABUN
RB-84	1.440E-01	NOT IDENT.
KR-85	8.987E+00	NOT IDENT.
SR-85	6.110E-02	NOT IDENT.
RB-86	2.382E+00	NOT IDENT.
Y-88	4.640E-02	NOT IDENT.
Y-91	2.063E+01	NOT IDENT.
NB-94	3.903E-02	FAIL ABUN
NB-95	5.735E-02	NOT IDENT.
NB-95M	1.879E-01	NOT IDENT.
ZR-95	9.406E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.382E-02	NOT IDENT.
RH-102	5.828E-02	NOT IDENT.
RU-103	5.858E-02	NOT IDENT.
RH-106	3.349E-01	NOT IDENT.
RU-106	3.349E-01	NOT IDENT.
AG-108M	3.046E-02	NOT IDENT.
CD-109	9.536E-01	NOT IDENT.
AG-110	1.036E+00	NOT IDENT.
AG-110M	7.442E-02	FAIL ABUN
SN-113	5.904E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.859E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.264E-02	NOT IDENT.
SB-124	1.114E-01	NOT IDENT.
SB-125	7.869E-02	NOT IDENT.
TE-125M	1.317E+01	NOT IDENT.
I-126	7.777E-01	NOT IDENT.
SB-126	4.448E-01	FAIL ABUN
SN-126	8.900E-02	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	9.885E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.646E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.511E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.860E-01	FAIL ABUN
BA-137M	3.971E-02	NOT IDENT.
CS-137	4.195E-02	NOT IDENT.
LA-138	7.281E-02	NOT IDENT.
CE-139	2.950E-02	NOT IDENT.
BA-140	1.004E+00	NOT IDENT.
LA-140	2.307E-01	FAIL ABUN
CE-141	1.182E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.251E-01	NOT IDENT.
PM-144	4.089E-02	NOT IDENT.
PR-144	3.110E+00	NOT IDENT.
PM-146	4.096E-02	NOT IDENT.
ND-147	2.641E+00	FAIL ABUN
PM-147	7.351E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	3.075E-02	FAIL ABUN
EU-152	1.237E-01	NOT IDENT.
GD-153	9.930E-02	NOT IDENT.
EU-154	1.286E-01	FAIL ABUN
EU-155	1.075E-01	NOT IDENT.
TB-160	1.629E-01	FAIL ABUN
HO-166M	5.897E-02	NOT IDENT.
TM-171	3.013E+01	NOT IDENT.

HF-172	2.013E-01	FAIL ABUN
LU-172	6.289E-02	FAIL ABUN
LU-176	2.706E-02	NOT IDENT.
HF-181	7.336E-02	NOT IDENT.
TA-182	2.121E-01	NOT IDENT.
RE-183	3.782E-01	NOT IDENT.
RE-184	2.241E-01	FAIL ABUN
W-188	8.866E+00	FAIL ABUN
IR-192	4.767E-02	FAIL ABUN
HG-203	5.762E-02	NOT IDENT.
TL-204	5.854E+00	NOT IDENT.
BI-207	5.475E-02	FAIL ABUN
BI-210	7.733E+00	NOT IDENT.
PB-210	7.733E+00	NOT IDENT.
PB-211	7.324E-01	NOT IDENT.
BI-213	1.212E-01	NOT IDENT.
RN-219	3.657E-01	NOT IDENT.
RA-223	6.378E-01	FAIL ABUN
AC-225	3.031E+00	NOT IDENT.
AC-227	2.602E-01	NOT IDENT.
TH-227	2.602E-01	NOT IDENT.
TH-229	4.562E-01	FAIL ABUN
PA-231	5.831E-01	NOT IDENT.
TH-231	6.378E-01	FAIL ABUN
PA-233	7.061E-02	NOT IDENT.
PA-234	3.689E-01	FAIL ABUN
PA-234M	6.623E+00	FAIL ABUN
U-235	2.225E-01	FAIL ABUN
NP-237	7.061E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.783E-01	NOT IDENT.
PU-239	3.388E+02	FAIL ABUN
AM-241	2.185E-01	NOT IDENT.
CM-243	1.122E-01	NOT IDENT.
BK-247	8.554E-02	NOT IDENT.
CM-247	3.243E-02	NOT IDENT.
CF-249	4.851E-02	NOT IDENT.
CF-251	1.179E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:51:44.72

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313911.CNF;1		
Acquisition date	: 28-FEB-2023 06:51:01	Sensitivity	: 3.000
Detector ID	: GAM03	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.33	Half life ratio	: *****
Sample date	: 20-JAN-2023 11:00:00	Nuclide Library	: SOLID
Sample ID	: G1205313911	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 9.6810E+01 GRAM
		Quantity Err(%)	: 1.0330E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 12-OCT-2022 09:50:42	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;29		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.160E+01	2.063E+00	2.063E+00
TL-208	1.899E-01	8.600E-02	8.600E-02
BI-211	1.547E+00	5.327E-01	5.327E-01
BI-212	5.514E-01	7.875E-01	7.875E-01
PB-212	6.636E-01	1.524E-01	1.524E-01
BI-214	7.048E-01	2.107E-01	2.107E-01
PB-214	5.615E-01	1.931E-01	1.931E-01
RN-222	7.048E-01	2.107E-01	2.107E-01
RA-224	2.214E+00	1.358E+00	1.358E+00
RA-226	5.615E-01	1.931E-01	1.931E-01
AC-228	3.367E-01	3.000E-01	3.000E-01
RA-228	3.367E-01	3.000E-01	3.000E-01
TH-228	6.636E-01	1.524E-01	1.524E-01
TH-230	5.614E-01	1.931E-01	1.931E-01
TH-232	3.367E-01	3.000E-01	3.000E-01
TH-234	2.132E+00	4.288E+00	4.288E+00
U-234	5.614E-01	1.931E-01	1.931E-01
U-238	2.132E+00	4.288E+00	4.288E+00
AM-243	2.102E-01	1.364E-01	1.364E-01
ANH-511	4.368E-02	9.869E-02	9.869E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.902E-02	4.881E-01	4.888E-01	NOT IDENT.
NA-22	-1.211E-02	5.742E-02	5.767E-02	NOT IDENT.
NA-24	-3.938E+16	2.397E+17	0.000E+00	SHORT HLIF
AL-26	6.785E-03	4.745E-02	4.755E-02	NOT IDENT.
SC-46	-2.690E-03	7.544E-02	7.545E-02	NOT IDENT.
V-48	-7.087E-02	2.943E-01	2.960E-01	NOT IDENT.
CR-51	-4.529E-01	8.744E-01	8.979E-01	NOT IDENT.
MN-52	6.460E+00	6.072E+00	6.734E+00	FAIL ABUN
MN-54	4.250E-02	4.443E-02	4.838E-02	NOT IDENT.
CO-56	-4.625E-02	5.918E-02	6.275E-02	NOT IDENT.

MN-56	-1.000E+41	1.289E+41	0.000E+00	SHORT HLIF
CO-57	-3.305E-02	3.048E-02	3.392E-02	NOT IDENT.
CO-58	-2.510E-02	5.966E-02	6.073E-02	NOT IDENT.
FE-59	2.189E-01	2.157E-01	2.372E-01	FAIL ABUN
CO-60	5.080E-02	4.692E-02	5.221E-02	NOT IDENT.
ZN-65	-9.803E-02	1.319E-01	1.391E-01	NOT IDENT.
GE-68	1.776E+00	1.672E+00	1.854E+00	NOT IDENT.
AS-73	9.150E-01	2.269E+00	2.306E+00	NOT IDENT.
AS-74	-3.396E-01	3.139E-01	3.492E-01	NOT IDENT.
SE-75	3.228E-02	6.188E-02	6.357E-02	NOT IDENT.
BR-77	1.043E+05	1.193E+05	1.283E+05	SHORT HLIF
SR-82	-3.700E-01	7.695E-01	7.874E-01	NOT IDENT.
RB-83	8.389E-03	1.070E-01	1.071E-01	FAIL ABUN
RB-84	4.490E-02	1.680E-01	1.692E-01	NOT IDENT.
KR-85	7.601E+00	1.069E+01	1.123E+01	NOT IDENT.
SR-85	5.160E-02	7.270E-02	7.633E-02	NOT IDENT.
RB-86	2.616E+00	2.289E+00	2.575E+00	NOT IDENT.
Y-88	2.266E-02	4.651E-02	4.761E-02	NOT IDENT.
Y-91	1.281E+00	2.411E+01	2.412E+01	NOT IDENT.
NB-94	-8.486E-03	4.854E-02	4.869E-02	FAIL ABUN
NB-95	-3.064E-02	8.246E-02	8.361E-02	NOT IDENT.
NB-95M	2.841E-01	2.021E-01	2.393E-01	NOT IDENT.
ZR-95	-7.695E-02	1.296E-01	1.342E-01	NOT IDENT.
NB-97	1.000E+41	1.402E+41	0.000E+00	SHORT HLIF
ZR-97	3.035E+16	3.318E+16	0.000E+00	SHORT HLIF
MO-99	1.548E+02	8.615E+03	8.616E+03	SHORT HLIF
TC-99M	-1.000E+41	7.750E+41	0.000E+00	SHORT HLIF
RH-101	1.969E-02	3.832E-02	3.933E-02	NOT IDENT.
RH-102	-2.634E-02	7.461E-02	7.555E-02	NOT IDENT.
RU-103	-3.445E-02	7.495E-02	7.654E-02	NOT IDENT.
RH-106	-1.864E-02	4.045E-01	4.046E-01	NOT IDENT.
RU-106	-1.864E-02	4.045E-01	4.046E-01	NOT IDENT.
AG-108M	-3.156E-03	3.614E-02	3.617E-02	NOT IDENT.
CD-109	1.955E-01	1.215E+00	1.218E+00	NOT IDENT.
AG-110	1.070E+00	1.080E+00	1.183E+00	NOT IDENT.
AG-110M	3.809E-02	8.456E-02	8.628E-02	FAIL ABUN
SN-113	1.018E-02	6.750E-02	6.766E-02	NOT IDENT.
CD-115	-5.741E+03	2.177E+04	2.192E+04	SHORT HLIF
SN-117M	-1.400E-01	2.353E-01	2.436E-01	NOT IDENT.
SB-122	-1.647E+02	1.064E+03	1.067E+03	SHORT HLIF
TE-123M	-1.793E-02	4.069E-02	4.148E-02	NOT IDENT.
SB-124	2.487E-02	1.251E-01	1.256E-01	NOT IDENT.
SB-125	-1.118E-02	1.071E-01	1.072E-01	NOT IDENT.
TE-125M	2.858E+00	1.685E+01	1.690E+01	NOT IDENT.
I-126	-3.911E-02	9.432E-01	9.433E-01	NOT IDENT.
SB-126	-1.279E-01	6.577E-01	6.603E-01	FAIL ABUN
SN-126	-5.372E-03	1.157E-01	1.157E-01	FAIL ABUN
SB-127	-1.207E+02	1.340E+02	1.446E+02	SHORT HLIF
I-131	-6.546E-01	1.329E+00	1.362E+00	NOT IDENT.
I-132	-1.000E+41	3.508E+41	0.000E+00	SHORT HLIF
TE-132	2.901E+01	1.445E+02	1.451E+02	SHORT HLIF
BA-133	2.632E-02	5.978E-02	6.094E-02	NOT IDENT.
I-133	-1.534E+11	1.278E+12	1.280E+12	SHORT HLIF
CS-134	2.368E-02	6.254E-02	6.344E-02	NOT IDENT.
I-135	-1.000E+41	1.547E+41	0.000E+00	SHORT HLIF
CS-136	-5.833E-03	4.550E-01	4.550E-01	FAIL ABUN
BA-137M	-1.762E-02	5.074E-02	5.135E-02	NOT IDENT.
CS-137	-1.862E-02	5.360E-02	5.425E-02	NOT IDENT.
LA-138	5.194E-02	7.345E-02	7.709E-02	NOT IDENT.
CE-139	-1.833E-02	3.749E-02	3.839E-02	NOT IDENT.
BA-140	-4.903E-01	1.272E+00	1.291E+00	NOT IDENT.
LA-140	-1.516E-01	3.482E-01	3.548E-01	FAIL ABUN
CE-141	6.227E-02	1.352E-01	1.381E-01	NOT IDENT.
CE-143	4.047E+07	2.915E+07	3.438E+07	SHORT HLIF
CE-144	7.638E-02	2.596E-01	2.619E-01	NOT IDENT.
PM-144	-3.477E-03	4.994E-02	4.996E-02	NOT IDENT.
PR-144	-2.236E-01	3.791E+00	3.792E+00	NOT IDENT.
PM-146	-3.863E-02	5.415E-02	5.688E-02	NOT IDENT.
ND-147	-1.393E+00	3.357E+00	3.415E+00	FAIL ABUN
PM-147	-3.095E+02	8.971E+02	9.078E+02	NOT IDENT.
PM-149	4.686E+04	2.022E+05	2.033E+05	SHORT HLIF
EU-150	2.768E-02	4.641E-02	4.806E-02	FAIL ABUN
EU-152	2.250E-02	1.509E-01	1.512E-01	NOT IDENT.
GD-153	-1.227E-02	1.275E-01	1.276E-01	NOT IDENT.
EU-154	-3.262E-02	1.610E-01	1.617E-01	FAIL ABUN
EU-155	-3.560E-02	1.296E-01	1.306E-01	NOT IDENT.
TB-160	-9.943E-02	2.233E-01	2.278E-01	FAIL ABUN
HO-166M	-1.484E-02	7.431E-02	7.461E-02	NOT IDENT.

TM-171	-3.831E+01	4.356E+01	4.686E+01	NOT IDENT.
HF-172	9.610E-02	2.292E-01	2.333E-01	FAIL ABUN
LU-172	-3.121E-02	9.536E-02	9.639E-02	FAIL ABUN
LU-176	1.340E-02	3.142E-02	3.199E-02	NOT IDENT.
HF-181	2.080E-02	8.342E-02	8.395E-02	NOT IDENT.
TA-182	-7.045E-02	3.123E-01	3.139E-01	NOT IDENT.
RE-183	1.600E-01	4.627E-01	4.683E-01	NOT IDENT.
RE-184	1.419E-01	2.723E-01	2.797E-01	FAIL ABUN
W-188	-6.944E+00	1.354E+01	1.390E+01	FAIL ABUN
IR-192	2.083E-02	5.602E-02	5.680E-02	FAIL ABUN
HG-203	1.153E-04	7.068E-02	7.068E-02	NOT IDENT.
TL-204	-2.857E+00	7.832E+00	7.937E+00	NOT IDENT.
BI-207	0.000E+00	6.443E-02	0.000E+00	FAIL ABUN
BI-210	-4.689E+00	1.030E+01	1.051E+01	NOT IDENT.
PB-210	-4.689E+00	1.030E+01	1.051E+01	NOT IDENT.
PB-211	2.826E-01	9.111E-01	9.200E-01	NOT IDENT.
BI-213	4.194E-03	1.416E-01	1.416E-01	NOT IDENT.
RN-219	-8.543E-02	5.015E-01	5.030E-01	NOT IDENT.
RA-223	8.499E-02	8.703E-01	8.711E-01	FAIL ABUN
AC-225	-9.374E-01	3.975E+00	3.998E+00	NOT IDENT.
AC-227	-1.138E-01	3.322E-01	3.361E-01	NOT IDENT.
TH-227	-1.138E-01	3.322E-01	3.361E-01	NOT IDENT.
TH-229	-4.469E-01	6.023E-01	6.351E-01	FAIL ABUN
PA-231	3.915E-01	6.780E-01	7.006E-01	NOT IDENT.
TH-231	8.499E-02	8.703E-01	8.711E-01	FAIL ABUN
PA-233	3.255E-02	8.270E-02	8.399E-02	NOT IDENT.
PA-234	3.246E-01	5.487E-01	5.679E-01	FAIL ABUN
PA-234M	7.502E+00	1.284E+01	1.328E+01	FAIL ABUN
U-235	-1.657E-01	2.751E-01	2.850E-01	FAIL ABUN
NP-237	3.255E-02	8.270E-02	8.399E-02	NOT IDENT.
NP-238	1.073E+04	6.659E+04	6.676E+04	SHORT HLIF
NP-239	-3.393E-02	3.691E-01	3.694E-01	NOT IDENT.
PU-239	-1.407E+02	4.137E+02	4.185E+02	FAIL ABUN
AM-241	-4.715E-02	2.841E-01	2.849E-01	NOT IDENT.
CM-243	6.640E-02	1.255E-01	1.290E-01	NOT IDENT.
BK-247	6.852E-02	9.688E-02	1.017E-01	NOT IDENT.
CM-247	-1.683E-02	4.663E-02	4.724E-02	NOT IDENT.
CF-249	3.468E-02	5.250E-02	5.477E-02	NOT IDENT.
CF-251	-5.807E-02	1.479E-01	1.502E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	51.0042	85.43	74.1071	131.20	51.8624
45.60	48.8309	86.55	76.8981	133.02	52.9272
46.54	61.1813	86.79	79.5813	133.52	49.1774
49.72	0.0000	86.94	79.6014	136.00	50.2789
51.35	49.5116	87.09	79.6211	136.47	46.5112
51.87	48.3319	87.57	71.7163	140.51	0.0000
52.39	57.0750	88.03	69.1125	143.76	62.2480
52.97	54.6660	88.34	63.8291	144.24	48.8688
53.44	39.7996	88.47	63.8427	145.44	54.6963
54.07	39.8562	89.96	82.6649	152.43	38.6979
57.36	0.0000	1093.63	69.4084	153.25	41.6396
57.53	48.9470	91.11	61.4465	323.87	41.6851
57.98	41.4567	92.59	61.5928	156.02	48.5708
59.27	51.6491	93.35	61.6676	158.56	60.4006
59.32	51.6546	94.56	55.0700	159.00	55.5568
59.54	51.6787	94.65	59.1079	162.33	38.1530
60.96	53.0975	94.67	59.1096	162.66	30.3378
61.17	53.1207	94.87	59.1284	163.33	35.2570
62.93	53.3140	97.43	48.5711	165.86	44.1930
63.29	53.3531	98.43	49.5469	176.31	53.6243
63.58	53.3846	98.44	49.5478	176.60	57.6135
64.28	56.0061	99.53	47.8258	177.52	43.7489
66.73	48.6057	100.11	56.8996	181.07	0.0000
67.24	62.7386	102.03	44.3838	181.52	46.4248
125.81	56.3854	103.18	45.3674	184.41	30.0397
67.75	61.5198	103.37	40.8424	143.76	46.1217
68.89	56.5180	105.21	47.3242	193.51	45.4683
69.67	43.7389	105.31	47.3313	197.03	46.6378
70.82	63.1734	106.12	46.4761	198.01	51.7564
70.83	63.1749	106.47	45.1323	201.83	41.7599
72.81	56.0776	109.28	45.3161	203.43	57.1245
72.87	56.0839	111.00	45.8865	205.31	38.3205
74.66	56.2697	111.76	0.0000	210.85	43.1407
74.82	56.2862	114.06	52.5361	215.65	35.5925
74.97	56.3017	116.30	0.0000	218.12	42.1862
77.11	56.5209	116.74	52.7316	222.11	46.6951
78.74	53.6333	119.76	39.9440	227.09	40.6468
79.69	53.7234	121.12	50.2539	227.38	40.6571
80.03	53.7549	121.22	50.2608	228.16	0.0000
80.12	53.7640	121.78	47.5041	228.18	33.3831
80.19	55.0821	122.06	52.1807	116.74	33.3831
80.57	55.1189	122.92	46.6433	235.69	31.4999
81.00	64.3536	123.07	46.6525	235.96	31.5070
81.07	64.3615	265.00	46.6904	238.63	31.5784
81.75	69.6976	125.81	43.0756	238.98	0.0000
82.47	74.7881	127.23	44.0931	240.99	31.6412
83.79	53.6663	127.91	42.2542	242.00	31.6681
84.00	53.6856	129.30	55.4992	244.70	30.1522

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	35.2761	563.25	20.1624
252.80	30.8857	345.93	32.4661	564.24	0.0000
254.15	0.0000	351.06	37.7165	569.33	17.3293
256.23	39.5154	351.93	27.4458	946.00	17.3304
260.90	0.0000	355.39	0.0000	569.70	17.3320
264.66	25.8037	356.01	20.6378	583.19	15.4990
264.80	25.8066	364.49	33.4280	584.27	9.3038
265.00	23.6597	366.42	0.0000	595.83	23.3767
269.46	28.0588	372.51	29.5394	427.87	21.4730
270.03	24.8324	375.05	23.2043	602.52	0.0000
271.23	33.5007	377.52	19.1725	604.72	17.2090
273.65	37.8939	356.01	18.6628	607.14	17.2267
276.40	32.5488	388.16	21.0498	609.32	20.5738
277.37	27.1439	388.63	15.7917	610.33	21.9543
277.60	32.5781	391.69	24.6098	614.28	14.1372
278.00	31.5016	264.66	21.2054	618.01	16.7162
279.20	33.7051	401.81	18.3904	620.36	14.7643
279.54	33.7139	402.40	19.8116	621.93	13.7889
279.70	34.8053	404.85	17.0057	630.19	0.0000
280.46	33.7372	410.95	17.0654	631.29	17.7979
283.69	33.8192	413.71	17.0921	633.25	21.7711
284.31	31.6515	414.70	17.1018	634.78	17.8237
285.41	33.8621	423.72	11.4592	635.95	20.8045
285.90	0.0000	427.09	12.9160	636.99	20.8135
287.50	26.2568	427.87	14.3572	657.50	10.9936
290.67	36.1877	433.94	19.8076	657.76	13.9932
293.27	0.0000	439.40	19.8667	657.90	0.0000
351.93	28.6062	440.45	23.4923	661.66	20.0214
295.96	34.6761	453.88	24.5722	664.57	0.0000
879.38	39.7053	463.37	11.8904	666.33	13.0385
299.98	43.0569	468.07	18.3377	666.50	13.0393
300.09	43.0601	473.00	0.0000	667.71	0.0000
300.13	43.0617	475.06	12.8830	677.62	17.1266
301.36	32.0486	476.78	8.2892	685.70	0.0000
302.85	33.1891	477.60	13.8210	692.65	0.0000
256.23	31.0129	482.18	17.5475	695.00	20.2850
304.85	31.0203	487.02	24.9973	696.49	17.2521
306.78	21.0785	492.35	0.0000	696.51	17.2527
308.46	32.2102	497.08	19.5404	697.00	14.2106
311.90	24.4944	505.52	20.9299	697.30	11.1668
316.51	24.5732	507.63	0.0000	697.49	11.1675
319.41	29.0987	511.00	17.8006	702.65	19.3276
320.08	31.3519	514.00	18.0141	706.68	17.3196
321.04	22.4089	514.00	18.0142	711.68	13.2698
323.87	23.5746	520.40	15.9992	720.70	9.8323
325.23	32.0237	520.69	0.0000	721.93	0.0000
328.76	19.1475	522.65	0.0000	722.78	6.5602
333.37	16.9470	527.90	0.0000	722.91	6.5604
333.97	20.3445	528.26	18.8934	723.31	6.5613
334.37	16.9583	529.59	17.9604	724.19	3.2817
338.28	27.2036	529.87	0.0000	727.33	19.7139
338.32	27.2041	531.02	20.8103	733.00	17.4913
311.90	32.3507	537.26	19.9227	735.93	13.1844
340.48	32.3507	546.56	0.0000	333.97	8.2449
340.55	32.3524	552.55	15.2871	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	23.1431	949.00	5.3077	1384.29	7.9207
747.24	14.4802	667.71	0.0000	1408.01	6.9672
748.06	11.3807	962.31	7.4013	1434.09	2.0020
752.31	9.3257	964.08	8.8862	1435.80	3.0041
753.82	12.4413	966.17	14.2270	1457.56	0.0000
756.73	17.6438	911.20	10.0116	1460.82	4.0271
756.80	17.6443	983.53	13.4066	1489.16	5.0642
884.68	18.3138	984.45	0.0000	1505.03	6.0976
765.81	13.3281	1274.44	17.9419	1584.12	7.2297
766.42	11.6645	1001.03	8.9834	1596.21	4.1412
766.84	16.6660	1002.74	8.9878	1620.50	1.0403
772.60	0.0000	1004.73	7.1945	1621.92	1.0406
776.52	12.5427	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.1092
778.90	12.5533	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	9.0786	1764.49	0.0000
788.74	16.7954	1038.76	0.0000	1063.66	3.2108
792.07	9.4584	631.29	10.0106	1771.35	4.2820
795.86	10.5234	1048.07	9.1045	1791.20	0.0000
810.06	11.6324	1049.04	7.2855	1808.65	3.2332
810.29	10.5756	1050.41	10.0214	1810.72	0.0000
344.28	10.5762	1063.66	9.1440	1836.06	1.0831
810.76	11.6351	1077.00	3.6711		
815.77	10.5954	1077.34	4.5894		
1048.07	11.6660	1085.87	10.1197		
832.01	14.9152	1093.63	10.7558		
834.85	5.3319	1099.45	6.1559		
835.71	8.5336	1112.07	9.2651		
836.80	0.0000	1112.84	11.1205		
846.75	0.0000	1115.54	16.6922		
846.77	12.8474	1120.29	13.9277		
856.80	22.5573	1120.55	12.0713		
860.56	19.3585	1221.41	8.3588		
871.09	6.4750	1129.67	6.5157		
873.19	5.1835	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	12.9847	1173.23	9.4141		
880.51	10.8246	1177.95	7.8544		
881.60	11.9111	1189.05	8.5069		
883.24	10.8340	1204.77	4.7446		
884.68	13.0067	1221.41	11.1169		
889.28	15.1967	1231.02	9.5513		
894.76	10.8737	1235.36	14.3423		
898.04	17.4160	1238.28	12.7578		
900.72	6.9723	1260.41	0.0000		
903.28	14.5374	1271.87	9.6465		
911.20	12.2418	1274.44	9.6523		
912.08	10.4956	1274.54	9.6528		
923.98	0.0000	1291.59	5.8151		
926.50	13.8060	1298.22	0.0000		
929.11	5.2756	1312.11	2.9216		
935.54	7.0480	1332.49	1.9569		
937.49	1.7630	1362.66	0.0000		
944.13	11.0413	1365.19	3.9434		
946.00	5.8921	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:14:04.33

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313912.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;776
                                    Background date  : 26-FEB-2023 09:12:30
Sample date      : 8-FEB-2023 00:00:00. Acquisition date : 28-FEB-2023 06:58:38
Sample ID        : G1205313912          Sample quantity  : 1.15000E+02 GRAM
Detector name    : GAM01                Detector geometry: CAN
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:01.81  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : RXF2
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 2379916              Detector SN#     :
Matrix Spike ID  :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	35.57*	551	713	1.52	71.25	68	8	6.12E-01	9.7	
2	0	46.48	3258	3160	1.23	93.05	87	13	3.62E+00	4.0	
3	0	59.53	12753	2888	1.24	119.12	112	14	1.42E+01	1.3	
4	0	87.52	140	491	1.31	175.06	172	7	1.55E-01	27.7	
5	0	661.63*	10137	241	1.58	1322.38	1314	17	1.13E+01	1.1	
6	0	746.52	20	108	0.97	1492.05	1487	10	2.21E-02	101.1	
7	0	912.19*	67	217	4.97	1823.19	1816	16	7.42E-02	50.8	
8	0	1173.21	3202	66	1.90	2344.94	2337	18	3.56E+00	1.9	
9	0	1332.49	2850	8	1.87	2663.35	2655	17	3.17E+00	1.9	
10	0	1353.35	8	12	0.61	2705.06	2698	10	9.17E-03	86.8	
11	0	1450.28	8	2	1.78	2898.83	2894	8	8.83E-03	47.1	
12	0	1464.22	10	0	1.06	2926.70	2923	8	1.11E-02	31.6	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 28-FEB-2023 07:14:05

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313912.CNF;1		
Analyses by	: PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4		
Sample title	: RXF2		
Sample date	: 8-FEB-2023 00:00:00	Acquisition date	: 28-FEB-2023 06:58:38
Sample ID	: G1205313912	Sample quantity	: 115.00 GRAM
Sample type	: SOLID	Sample geometry	:
Detector name	: GAMMA1	Detector geometry	: CAN
Elapsed live time	: 0 00:15:00.00	Elapsed real time	: 0 00:15:01.81 0.2%
Energy tolerance	: 1.50 keV	Half life ratio	: 10.00
Errors propagated	: No	Systematic Error	: 0.00 %
Efficiency type	: Empirical	Efficiencies at	: Peak Energy
Abundance limit	: 75.00		

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	3050	99.85	1.167E+00	6.834E+01	6.884E+01	3.73
	1332.49	2699	99.98*	1.042E+00	6.764E+01	6.813E+01	3.78
CD-109	88.03	148	3.70*	4.926E+00	2.127E+01	2.193E+01	55.37
SN-126	64.28	------	9.60	2.459E+00	------ Line Not Found		------
	86.94	148	8.90	4.926E+00	8.843E+00	8.843E+00	55.37
	87.57	148	37.00*	4.926E+00	2.127E+00	2.127E+00	55.37
BA-137M	661.66	9900	89.90*	1.962E+00	1.466E+02	1.467E+02	2.11
CS-137	661.66	9900	85.10*	1.962E+00	1.548E+02	1.550E+02	2.11
BI-210	46.54	3547	4.25*	4.785E-01	4.555E+03	4.563E+03	7.94
PB-210	46.54	3547	4.25*	4.785E-01	4.555E+03	4.563E+03	7.94
AM-241	59.54	13752	35.90*	1.846E+00	5.420E+02	5.421E+02	2.53

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:14:06.32

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313912.CNF;1		
Acquisition date	: 28-FEB-2023 06:58:38	Sensitivity	: 3.000
Detector ID	: GAM01	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:01.81	Half life ratio	: *****
Sample date	: 8-FEB-2023 00:00:00	Analyst initials	: RXF2
Sample ID	: G1205313912	Sample Quantity	: 1.1500E+02 GRAM
Batch Number	: 2379916	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;17		

CALIBRATION INFORMATION

Eff. Cal. date	: 14-JUN-2022 06:30:26	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
CO-60	6.813E+01	2.521E+00	5.722E-01
CD-109	2.193E+01	1.190E+01	1.429E+01
SN-126	2.127E+00	1.154E+00	1.369E+00
BA-137M	1.467E+02	3.031E+00	7.747E-01
CS-137	1.550E+02	3.202E+00	8.184E-01
BI-210	4.563E+03	3.551E+02	2.161E+02
PB-210	4.563E+03	3.551E+02	2.161E+02
AM-241	5.421E+02	1.345E+01	5.914E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	6.728E+00	5.955E+00	1.075E+01	NOT IDENT.
NA-22	-1.893E-01	2.639E-01	4.525E-01	NOT IDENT.
NA-24	0.000E+00	1.143E+09	0.000E+00	SHORT HLIF
AL-26	-1.251E-01	2.237E-01	3.886E-01	NOT IDENT.
K-40	3.401E-01	1.280E+00	3.034E+00	NOT IDENT.
SC-46	6.280E-02	5.864E-01	1.075E+00	NOT IDENT.
V-48	-3.208E-01	1.237E+00	2.212E+00	NOT IDENT.
CR-51	-2.330E+00	5.668E+00	9.833E+00	NOT IDENT.
MN-52	3.397E-01	2.140E+00	4.636E+00	NOT IDENT.
MN-54	6.368E-02	4.720E-01	8.714E-01	NOT IDENT.
CO-56	-2.905E-02	5.495E-01	1.003E+00	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.215E-01	2.745E-01	4.945E-01	NOT IDENT.
CO-58	2.257E-02	5.376E-01	9.246E-01	NOT IDENT.
FE-59	-7.888E-01	1.397E+00	2.428E+00	NOT IDENT.
ZN-65	7.958E-01	1.155E+00	2.180E+00	NOT IDENT.
GE-68	1.346E+01	1.854E+01	3.493E+01	NOT IDENT.
AS-73	-6.731E+00	2.837E+01	4.718E+01	NOT IDENT.
AS-74	-1.219E+00	1.379E+00	2.253E+00	NOT IDENT.
SE-75	5.242E-02	5.865E-01	1.045E+00	NOT IDENT.
BR-77	2.644E+02	4.657E+02	8.490E+02	NOT IDENT.
SR-82	3.472E-01	4.691E+00	8.129E+00	NOT IDENT.

RB-83	-2.194E-01	1.014E+00	1.740E+00	NOT IDENT.
RB-84	5.511E-01	1.054E+00	1.983E+00	NOT IDENT.
KR-85	-1.071E+02	9.565E+01	1.560E+02	NOT IDENT.
SR-85	-5.995E-01	5.352E-01	8.728E-01	NOT IDENT.
RB-86	1.569E+01	1.389E+01	2.677E+01	NOT IDENT.
Y-88	-1.378E-01	2.397E-01	4.142E-01	NOT IDENT.
Y-91	-2.163E+02	1.576E+02	2.444E+02	NOT IDENT.
NB-94	6.638E-02	3.493E-01	6.172E-01	NOT IDENT.
NB-95	-4.177E-01	5.394E-01	8.721E-01	NOT IDENT.
NB-95M	-6.338E-01	1.444E+00	2.535E+00	NOT IDENT.
ZR-95	-1.626E-01	9.010E-01	1.533E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.757E+09	0.000E+00	SHORT HLIF
MO-99	-5.315E+02	5.377E+02	8.546E+02	NOT IDENT.
TC-99M	0.000E+00	5.671E+23	0.000E+00	SHORT HLIF
RH-101	1.622E-01	3.374E-01	6.243E-01	NOT IDENT.
RH-102	-2.713E-02	6.741E-01	1.166E+00	NOT IDENT.
RU-103	-1.347E-01	6.684E-01	1.147E+00	NOT IDENT.
RH-106	-2.039E+00	4.176E+00	6.993E+00	NOT IDENT.
RU-106	-2.039E+00	4.176E+00	6.993E+00	NOT IDENT.
AG-108M	7.530E-02	5.020E-01	8.758E-01	NOT IDENT.
AG-110	6.153E+00	1.097E+01	1.762E+01	NOT IDENT.
AG-110M	-9.841E-02	7.026E-01	1.271E+00	NOT IDENT.
SN-113	-2.687E-01	6.906E-01	1.187E+00	NOT IDENT.
CD-115	-3.201E+02	7.925E+02	1.345E+03	NOT IDENT.
SN-117M	-2.319E-01	7.209E-01	1.293E+00	NOT IDENT.
SB-122	-8.189E+01	9.581E+01	1.583E+02	NOT IDENT.
TE-123M	-1.468E-01	3.041E-01	5.419E-01	NOT IDENT.
SB-124	-2.082E-01	4.953E-01	9.150E-01	NOT IDENT.
SB-125	1.119E-01	1.520E+00	2.647E+00	NOT IDENT.
TE-125M	1.878E+01	1.099E+02	2.025E+02	NOT IDENT.
I-126	-2.681E-01	3.599E+00	5.524E+00	NOT IDENT.
SB-126	1.553E+00	2.323E+00	4.202E+00	NOT IDENT.
SB-127	-1.046E+01	3.570E+01	6.071E+01	NOT IDENT.
I-131	-1.752E+00	2.639E+00	4.500E+00	NOT IDENT.
I-132	0.000E+00	1.015E+41	0.000E+00	SHORT HLIF
TE-132	3.708E+00	2.672E+01	4.793E+01	NOT IDENT.
BA-133	-2.537E-01	5.890E-01	1.015E+00	NOT IDENT.
I-133	0.000E+00	5.084E+06	0.000E+00	SHORT HLIF
CS-134	-1.372E-01	5.144E-01	8.646E-01	NOT IDENT.
I-135	0.000E+00	1.520E+22	0.000E+00	SHORT HLIF
CS-136	8.090E-01	1.919E+00	3.571E+00	NOT IDENT.
LA-138	4.184E-02	2.640E-01	5.719E-01	NOT IDENT.
CE-139	-1.345E-01	3.131E-01	5.584E-01	NOT IDENT.
BA-140	4.261E+00	4.636E+00	8.483E+00	NOT IDENT.
LA-140	-8.577E-02	5.481E-01	1.109E+00	NOT IDENT.
CE-141	-2.287E-01	7.166E-01	1.288E+00	NOT IDENT.
CE-143	0.000E+00	2.033E+04	0.000E+00	SHORT HLIF
CE-144	-1.694E+00	2.021E+00	3.582E+00	NOT IDENT.
PM-144	-7.822E-02	3.658E-01	6.254E-01	NOT IDENT.
PR-144	-5.564E+00	2.748E+01	4.701E+01	NOT IDENT.
PM-146	-3.132E-01	7.717E-01	1.312E+00	FAIL ABUN
ND-147	2.299E-01	1.059E+01	1.842E+01	NOT IDENT.
PM-147	-2.372E+02	7.852E+03	1.434E+04	NOT IDENT.
PM-149	1.444E+03	5.842E+03	1.046E+04	NOT IDENT.
EU-150	1.375E-01	3.583E-01	6.409E-01	NOT IDENT.
EU-152	-5.793E-01	1.299E+00	2.243E+00	NOT IDENT.
GD-153	3.622E-01	9.194E-01	1.710E+00	NOT IDENT.
EU-154	-4.353E-01	7.400E-01	1.301E+00	NOT IDENT.
EU-155	-6.264E-01	1.132E+00	2.041E+00	FAIL ABUN
TB-160	-4.220E-01	1.926E+00	3.471E+00	FAIL ABUN
HO-166M	-1.393E-01	7.217E-01	1.229E+00	NOT IDENT.
TM-171	-5.104E+02	5.779E+02	9.478E+02	NOT IDENT.
HF-172	-6.899E-02	2.056E+00	3.746E+00	NOT IDENT.
LU-172	5.137E-02	9.410E-01	1.702E+00	FAIL ABUN
LU-176	-2.997E-01	3.512E-01	5.993E-01	FAIL ABUN
HF-181	-5.203E-01	7.665E-01	1.285E+00	NOT IDENT.
TA-182	4.037E-01	1.384E+00	2.692E+00	NOT IDENT.
RE-183	0.000E+00	8.265E+00	1.811E+01	FAIL ABUN
RE-184	1.523E-01	2.107E+00	3.837E+00	NOT IDENT.
W-188	-1.310E+01	9.370E+01	1.652E+02	NOT IDENT.
IR-192	-2.401E-01	4.754E-01	8.222E-01	NOT IDENT.
HG-203	2.541E-01	4.969E-01	9.004E-01	NOT IDENT.
TL-204	-2.087E+01	6.182E+01	1.023E+02	NOT IDENT.
BI-207	-7.091E-01	7.481E-01	1.270E+00	NOT IDENT.
TL-208	-2.591E-01	4.468E-01	7.476E-01	NOT IDENT.
BI-211	1.399E+00	2.821E+00	5.057E+00	NOT IDENT.
PB-211	-4.329E-01	1.083E+01	1.886E+01	NOT IDENT.

BI-212	6.273E-01	5.365E+00	9.433E+00	NOT IDENT.
PB-212	5.055E-02	6.710E-01	1.202E+00	NOT IDENT.
BI-213	7.660E-01	1.834E+00	3.226E+00	NOT IDENT.
BI-214	-3.153E-01	8.352E-01	1.417E+00	NOT IDENT.
PB-214	1.023E-01	1.026E+00	1.810E+00	FAIL ABUN
RN-219	1.379E+00	6.288E+00	1.105E+01	NOT IDENT.
RN-222	-3.153E-01	8.352E-01	1.417E+00	NOT IDENT.
RA-223	3.840E-01	8.494E+00	1.501E+01	NOT IDENT.
RA-224	-3.072E-01	7.263E+00	1.292E+01	NOT IDENT.
AC-225	-3.952E+00	1.008E+01	1.777E+01	NOT IDENT.
RA-226	1.023E-01	1.026E+00	1.810E+00	FAIL ABUN
AC-227	-5.551E-01	3.101E+00	5.482E+00	NOT IDENT.
TH-227	-5.551E-01	3.101E+00	5.482E+00	NOT IDENT.
AC-228	0.000E+00	4.397E+00	3.809E+00	FAIL ABUN
RA-228	0.000E+00	4.397E+00	3.809E+00	FAIL ABUN
TH-228	5.055E-02	6.710E-01	1.202E+00	NOT IDENT.
TH-229	-9.088E-01	6.098E+00	1.089E+01	FAIL ABUN
TH-230	1.023E-01	1.026E+00	1.810E+00	FAIL ABUN
PA-231	-9.991E-01	5.988E+00	1.052E+01	NOT IDENT.
TH-231	3.840E-01	8.494E+00	1.501E+01	NOT IDENT.
TH-232	0.000E+00	4.397E+00	3.809E+00	FAIL ABUN
PA-233	-2.366E-01	8.789E-01	1.535E+00	NOT IDENT.
PA-234	-7.089E-01	4.825E+00	8.648E+00	NOT IDENT.
PA-234M	-2.896E+01	6.412E+01	1.133E+02	NOT IDENT.
TH-234	9.538E+00	1.860E+01	2.964E+01	NOT IDENT.
U-234	1.023E-01	1.026E+00	1.810E+00	FAIL ABUN
U-235	-3.228E-01	2.037E+00	3.687E+00	NOT IDENT.
NP-237	-2.366E-01	8.789E-01	1.535E+00	NOT IDENT.
NP-238	-1.095E+03	1.595E+03	2.772E+03	NOT IDENT.
U-238	9.538E+00	1.860E+01	2.964E+01	NOT IDENT.
NP-239	-3.295E-01	2.734E+00	4.987E+00	NOT IDENT.
PU-239	4.664E+02	3.497E+03	6.406E+03	NOT IDENT.
AM-243	-2.076E-01	6.257E-01	1.034E+00	NOT IDENT.
CM-243	7.008E-01	1.180E+00	2.202E+00	NOT IDENT.
BK-247	3.763E-03	1.018E+00	1.809E+00	NOT IDENT.
CM-247	2.954E-01	5.799E-01	1.031E+00	NOT IDENT.
CF-249	-1.798E-01	5.839E-01	1.008E+00	NOT IDENT.
CF-251	6.186E-01	1.361E+00	2.496E+00	NOT IDENT.
ANH-511	9.658E-02	4.180E-01	7.486E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:14:05.03

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	3050	99.85	1.167E+00	6.834E+01	6.884E+01	3.73
	1332.49	2699	99.98*	1.042E+00	6.764E+01	6.813E+01	3.78
CD-109	88.03	148	3.70*	4.926E+00	2.127E+01	2.193E+01	55.37
SN-126	64.28	------	9.60	2.459E+00	------ Line Not Found		------
	86.94	148	8.90	4.926E+00	8.843E+00	8.843E+00	55.37
	87.57	148	37.00*	4.926E+00	2.127E+00	2.127E+00	55.37
BA-137M	661.66	9900	89.90*	1.962E+00	1.466E+02	1.467E+02	2.11
CS-137	661.66	9900	85.10*	1.962E+00	1.548E+02	1.550E+02	2.11
BI-210	46.54	3547	4.25*	4.785E-01	4.555E+03	4.563E+03	7.94
PB-210	46.54	3547	4.25*	4.785E-01	4.555E+03	4.563E+03	7.94
AM-241	59.54	13752	35.90*	1.846E+00	5.420E+02	5.421E+02	2.53

Flag: "*" = Keyline

Sample ID : G1205313912 Acquisition date : 28-FEB-2023 06:58:38

Total number of lines in spectrum	12	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	8	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	5.27Y	1.01	6.764E+01	6.813E+01	0.257E+01	3.78	
CD-109	461.40D	1.03	2.127E+01	2.193E+01	1.214E+01	55.37	
SN-126	2.30E+05Y	1.00	2.127E+00	2.127E+00	1.178E+00	55.37	
BA-137M	30.08Y	1.00	1.466E+02	1.467E+02	0.031E+02	2.11	
CS-137	30.08Y	1.00	1.548E+02	1.550E+02	0.033E+02	2.11	
BI-210	22.20Y	1.00	4.555E+03	4.563E+03	0.362E+03	7.94	
PB-210	22.20Y	1.00	4.555E+03	4.563E+03	0.362E+03	7.94	
AM-241	432.60Y	1.00	5.420E+02	5.421E+02	0.137E+02	2.53	
	Total Activity :		1.004E+04	1.006E+04			

Grand Total Activity : 1.004E+04 1.006E+04

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : G1205313912 Acquisition date : 28-FEB-2023 06:58:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	35.57	606	785	1.52	71.25	68	8	6.12E-01	19.3	4.25E-02	
0	746.52	19	105	0.97	1492.05	1487	10	2.21E-02	****	1.77E+00	T
0	912.19	64	209	4.97	1823.19	1816	16	7.42E-02	****	1.47E+00	T
0	1353.35	8	11	0.61	2705.06	2698	10	9.17E-03	****	1.03E+00	
0	1450.28	8	2	1.78	2898.83	2894	8	8.83E-03	94.1	9.71E-01	
0	1464.22	9	0	1.06	2926.70	2923	8	1.11E-02	63.2	9.64E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:14:15.40

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313912.CNF;1  *
* Acquisition date : 28-FEB-2023 06:58:38 Sensitivity     : 3.000           *
* Detector ID      : GAM01                Energy tolerance: 1.500           *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 00:15:01.81     Half life ratio : *****           *
* Sample date      :  8-FEB-2023 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : G1205313912          Analyst initials: RXF2            *
* Batch Number     : 2379916              Sample Quantity : 1.1500E+02 GRAM *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 14-JUN-2022 06:30:26 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;17            *
*****************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
CO-60	2.522E-01
CD-109	6.946E+00
SN-126	6.651E-01
BA-137M	3.674E-01
CS-137	3.881E-01
BI-210	1.064E+02
PB-210	1.064E+02
AM-241	2.904E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	5.207E+00	NOT IDENT.
NA-22	1.933E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.523E-01	NOT IDENT.
K-40	1.175E+00	NOT IDENT.
SC-46	5.099E-01	NOT IDENT.
V-48	1.045E+00	NOT IDENT.
CR-51	4.749E+00	NOT IDENT.
MN-52	1.873E+00	NOT IDENT.
MN-54	4.128E-01	NOT IDENT.
CO-56	4.747E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.400E-01	NOT IDENT.
CO-58	4.361E-01	NOT IDENT.
FE-59	1.146E+00	NOT IDENT.
ZN-65	1.030E+00	NOT IDENT.
GE-68	1.656E+01	NOT IDENT.
AS-73	2.323E+01	NOT IDENT.
AS-74	1.065E+00	NOT IDENT.
SE-75	5.061E-01	NOT IDENT.
BR-77	4.115E+02	NOT IDENT.
SR-82	3.826E+00	NOT IDENT.
RB-83	8.316E-01	NOT IDENT.

RB-84	9.399E-01	NOT IDENT.
KR-85	7.463E+01	NOT IDENT.
SR-85	4.176E-01	NOT IDENT.
RB-86	1.271E+01	NOT IDENT.
Y-88	1.585E-01	NOT IDENT.
Y-91	1.071E+02	NOT IDENT.
NB-94	2.897E-01	NOT IDENT.
NB-95	4.107E-01	NOT IDENT.
NB-95M	1.228E+00	NOT IDENT.
ZR-95	7.205E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	4.001E+02	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.034E-01	NOT IDENT.
RH-102	5.520E-01	NOT IDENT.
RU-103	5.511E-01	NOT IDENT.
RH-106	3.319E+00	NOT IDENT.
RU-106	3.319E+00	NOT IDENT.
AG-108M	4.239E-01	NOT IDENT.
AG-110	8.394E+00	NOT IDENT.
AG-110M	6.021E-01	NOT IDENT.
SN-113	5.729E-01	NOT IDENT.
CD-115	6.425E+02	NOT IDENT.
SN-117M	6.261E-01	NOT IDENT.
SB-122	7.525E+01	NOT IDENT.
TE-123M	2.626E-01	NOT IDENT.
SB-124	3.503E-01	NOT IDENT.
SB-125	1.281E+00	NOT IDENT.
TE-125M	9.838E+01	NOT IDENT.
I-126	2.599E+00	NOT IDENT.
SB-126	1.989E+00	NOT IDENT.
SB-127	2.841E+01	NOT IDENT.
I-131	2.172E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	2.325E+01	NOT IDENT.
BA-133	4.901E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.072E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.687E+00	NOT IDENT.
LA-138	2.311E-01	NOT IDENT.
CE-139	2.704E-01	NOT IDENT.
BA-140	4.056E+00	NOT IDENT.
LA-140	4.314E-01	NOT IDENT.
CE-141	6.248E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.735E+00	NOT IDENT.
PM-144	2.931E-01	NOT IDENT.
PR-144	2.204E+01	NOT IDENT.
PM-146	6.357E-01	FAIL ABUN
ND-147	8.803E+00	NOT IDENT.
PM-147	6.959E+03	NOT IDENT.
PM-149	5.056E+03	NOT IDENT.
EU-150	3.097E-01	NOT IDENT.
EU-152	1.081E+00	NOT IDENT.
GD-153	8.315E-01	NOT IDENT.
EU-154	5.574E-01	NOT IDENT.
EU-155	9.912E-01	FAIL ABUN
TB-160	1.642E+00	FAIL ABUN
HO-166M	5.794E-01	NOT IDENT.
TM-171	4.663E+02	NOT IDENT.
HF-172	1.820E+00	NOT IDENT.
LU-172	8.055E-01	FAIL ABUN
LU-176	2.893E-01	FAIL ABUN
HF-181	6.189E-01	NOT IDENT.
TA-182	1.215E+00	NOT IDENT.
RE-183	8.983E+00	FAIL ABUN
RE-184	1.827E+00	NOT IDENT.
W-188	7.976E+01	NOT IDENT.
IR-192	3.966E-01	NOT IDENT.
HG-203	4.352E-01	NOT IDENT.
TL-204	4.975E+01	NOT IDENT.
BI-207	5.983E-01	NOT IDENT.
TL-208	3.549E-01	NOT IDENT.
BI-211	2.445E+00	NOT IDENT.
PB-211	9.111E+00	NOT IDENT.
BI-212	4.425E+00	NOT IDENT.

PB-212	5.825E-01	NOT IDENT.
BI-213	1.564E+00	NOT IDENT.
BI-214	6.718E-01	NOT IDENT.
PB-214	8.750E-01	FAIL ABUN
RN-219	5.347E+00	NOT IDENT.
RN-222	6.718E-01	NOT IDENT.
RA-223	7.249E+00	NOT IDENT.
RA-224	6.263E+00	NOT IDENT.
AC-225	8.617E+00	NOT IDENT.
RA-226	8.750E-01	FAIL ABUN
AC-227	2.652E+00	NOT IDENT.
TH-227	2.652E+00	NOT IDENT.
AC-228	1.812E+00	FAIL ABUN
RA-228	1.812E+00	FAIL ABUN
TH-228	5.825E-01	NOT IDENT.
TH-229	5.289E+00	FAIL ABUN
TH-230	8.749E-01	FAIL ABUN
PA-231	5.083E+00	NOT IDENT.
TH-231	7.249E+00	NOT IDENT.
TH-232	1.812E+00	FAIL ABUN
PA-233	7.419E-01	NOT IDENT.
PA-234	4.119E+00	NOT IDENT.
PA-234M	5.354E+01	NOT IDENT.
TH-234	1.441E+01	NOT IDENT.
U-234	8.749E-01	FAIL ABUN
U-235	1.788E+00	NOT IDENT.
NP-237	7.419E-01	NOT IDENT.
NP-238	1.309E+03	NOT IDENT.
U-238	1.441E+01	NOT IDENT.
NP-239	2.419E+00	NOT IDENT.
PU-239	3.109E+03	NOT IDENT.
AM-243	5.027E-01	NOT IDENT.
CM-243	1.071E+00	NOT IDENT.
BK-247	8.758E-01	NOT IDENT.
CM-247	4.989E-01	NOT IDENT.
CF-249	4.863E-01	NOT IDENT.
CF-251	1.210E+00	NOT IDENT.
ANH-511	3.599E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 28-FEB-2023 07:14:19.00

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205313912.CNF;1		
Acquisition date	: 28-FEB-2023 06:58:38	Sensitivity	: 3.000
Detector ID	: GAM01	Energy tolerance	: 1.500
Elapsed live time	: 0 00:15:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 00:15:01.81	Half life ratio	: *****
Sample date	: 8-FEB-2023 00:00:00	Nuclide Library	: SOLID
Sample ID	: G1205313912	Analyst initials	: RXF2
Batch Number	: 2379916	Sample Quantity	: 1.1500E+02 GRAM
		Quantity Err(%)	: 1.7391E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 14-JUN-2022 06:30:26	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
CO-60	6.813E+01	7.166E+00	7.166E+00
CD-109	2.193E+01	1.214E+01	1.214E+01
SN-126	2.127E+00	1.172E+00	1.172E+00
BA-137M	1.467E+02	1.293E+01	1.293E+01
CS-137	1.550E+02	1.365E+01	1.365E+01
BI-210	4.563E+03	6.286E+02	6.286E+02
PB-210	4.563E+03	6.286E+02	6.286E+02
AM-241	5.421E+02	6.292E+01	6.292E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	6.728E+00	5.984E+00	6.709E+00	NOT IDENT.
NA-22	-1.893E-01	2.644E-01	2.779E-01	NOT IDENT.
NA-24	-4.560E+08	1.144E+09	1.162E+09	SHORT HLIF
AL-26	-1.251E-01	2.240E-01	2.309E-01	NOT IDENT.
K-40	3.401E-01	1.281E+00	1.290E+00	NOT IDENT.
SC-46	6.280E-02	5.865E-01	5.871E-01	NOT IDENT.
V-48	-3.208E-01	1.238E+00	1.246E+00	NOT IDENT.
CR-51	-2.330E+00	5.672E+00	5.768E+00	NOT IDENT.
MN-52	3.397E-01	2.140E+00	2.145E+00	NOT IDENT.
MN-54	6.368E-02	4.720E-01	4.729E-01	NOT IDENT.
CO-56	-2.905E-02	5.495E-01	5.496E-01	NOT IDENT.
MN-56	-1.000E+41	1.748E+42	0.000E+00	SHORT HLIF
CO-57	-1.215E-01	2.747E-01	2.801E-01	NOT IDENT.
CO-58	2.257E-02	5.376E-01	5.377E-01	NOT IDENT.
FE-59	-7.888E-01	1.399E+00	1.444E+00	NOT IDENT.
ZN-65	7.958E-01	1.157E+00	1.212E+00	NOT IDENT.
GE-68	1.346E+01	1.858E+01	1.954E+01	NOT IDENT.
AS-73	-6.731E+00	2.841E+01	2.857E+01	NOT IDENT.
AS-74	-1.219E+00	1.386E+00	1.491E+00	NOT IDENT.
SE-75	5.242E-02	5.865E-01	5.870E-01	NOT IDENT.
BR-77	2.644E+02	4.913E+02	5.055E+02	NOT IDENT.
SR-82	3.472E-01	4.691E+00	4.694E+00	NOT IDENT.

RB-83	-2.194E-01	1.014E+00	1.019E+00	NOT IDENT.
RB-84	5.511E-01	1.055E+00	1.084E+00	NOT IDENT.
KR-85	-1.071E+02	9.612E+01	1.076E+02	NOT IDENT.
SR-85	-5.995E-01	5.378E-01	6.019E-01	NOT IDENT.
RB-86	1.569E+01	1.396E+01	1.565E+01	NOT IDENT.
Y-88	-1.378E-01	2.399E-01	2.478E-01	NOT IDENT.
Y-91	-2.163E+02	1.587E+02	1.862E+02	NOT IDENT.
NB-94	6.638E-02	3.494E-01	3.507E-01	NOT IDENT.
NB-95	-4.177E-01	5.408E-01	5.726E-01	NOT IDENT.
NB-95M	-6.338E-01	1.445E+00	1.473E+00	NOT IDENT.
ZR-95	-1.626E-01	9.012E-01	9.041E-01	NOT IDENT.
NB-97	1.000E+41	2.553E+41	0.000E+00	SHORT HLIF
ZR-97	3.273E+09	3.768E+09	4.047E+09	SHORT HLIF
MO-99	-5.315E+02	5.402E+02	5.909E+02	NOT IDENT.
TC-99M	-2.245E+23	5.677E+23	0.000E+00	SHORT HLIF
RH-101	1.622E-01	3.388E-01	3.466E-01	NOT IDENT.
RH-102	-2.713E-02	6.741E-01	6.742E-01	NOT IDENT.
RU-103	-1.347E-01	6.685E-01	6.713E-01	NOT IDENT.
RH-106	-2.039E+00	4.180E+00	4.280E+00	NOT IDENT.
RU-106	-2.039E+00	4.180E+00	4.280E+00	NOT IDENT.
AG-108M	7.530E-02	5.021E-01	5.032E-01	NOT IDENT.
AG-110	6.153E+00	1.098E+01	1.133E+01	NOT IDENT.
AG-110M	-9.841E-02	7.027E-01	7.041E-01	NOT IDENT.
SN-113	-2.687E-01	6.909E-01	7.015E-01	NOT IDENT.
CD-115	-3.201E+02	7.932E+02	8.062E+02	NOT IDENT.
SN-117M	-2.319E-01	7.211E-01	7.287E-01	NOT IDENT.
SB-122	-8.189E+01	9.609E+01	1.029E+02	NOT IDENT.
TE-123M	-1.468E-01	3.043E-01	3.114E-01	NOT IDENT.
SB-124	-2.082E-01	4.957E-01	5.045E-01	NOT IDENT.
SB-125	1.119E-01	1.520E+00	1.521E+00	NOT IDENT.
TE-125M	1.878E+01	1.099E+02	1.102E+02	NOT IDENT.
I-126	-2.681E-01	3.599E+00	3.601E+00	NOT IDENT.
SB-126	1.553E+00	2.332E+00	2.434E+00	NOT IDENT.
SB-127	-1.046E+01	3.572E+01	3.603E+01	NOT IDENT.
I-131	-1.752E+00	2.644E+00	2.759E+00	NOT IDENT.
I-132	1.000E+41	1.613E+41	0.000E+00	SHORT HLIF
TE-132	3.708E+00	2.672E+01	2.678E+01	NOT IDENT.
BA-133	-2.537E-01	5.893E-01	6.003E-01	NOT IDENT.
I-133	-1.959E+06	5.093E+06	5.169E+06	SHORT HLIF
CS-134	-1.372E-01	5.145E-01	5.182E-01	NOT IDENT.
I-135	1.029E+22	1.595E+22	0.000E+00	SHORT HLIF
CS-136	8.090E-01	1.921E+00	1.955E+00	NOT IDENT.
LA-138	4.184E-02	2.640E-01	2.647E-01	NOT IDENT.
CE-139	-1.345E-01	3.144E-01	3.202E-01	NOT IDENT.
BA-140	4.261E+00	4.651E+00	5.032E+00	NOT IDENT.
LA-140	-8.577E-02	5.481E-01	5.495E-01	NOT IDENT.
CE-141	-2.287E-01	7.168E-01	7.241E-01	NOT IDENT.
CE-143	-5.406E+02	2.033E+04	2.034E+04	SHORT HLIF
CE-144	-1.694E+00	2.026E+00	2.165E+00	NOT IDENT.
PM-144	-7.822E-02	3.659E-01	3.676E-01	NOT IDENT.
PR-144	-5.564E+00	2.748E+01	2.759E+01	NOT IDENT.
PM-146	-3.132E-01	7.724E-01	7.852E-01	FAIL ABUN
ND-147	2.299E-01	1.059E+01	1.059E+01	NOT IDENT.
PM-147	-2.372E+02	7.852E+03	7.853E+03	NOT IDENT.
PM-149	1.444E+03	5.846E+03	5.883E+03	NOT IDENT.
EU-150	1.375E-01	3.584E-01	3.638E-01	NOT IDENT.
EU-152	-5.793E-01	1.300E+00	1.326E+00	NOT IDENT.
GD-153	3.622E-01	9.199E-01	9.343E-01	NOT IDENT.
EU-154	-4.353E-01	7.411E-01	7.666E-01	NOT IDENT.
EU-155	-6.264E-01	1.133E+00	1.168E+00	FAIL ABUN
TB-160	-4.220E-01	1.926E+00	1.935E+00	FAIL ABUN
HO-166M	-1.393E-01	7.219E-01	7.246E-01	NOT IDENT.
TM-171	-5.104E+02	5.816E+02	6.255E+02	NOT IDENT.
HF-172	-6.899E-02	2.056E+00	2.056E+00	NOT IDENT.
LU-172	5.137E-02	9.411E-01	9.413E-01	FAIL ABUN
LU-176	-2.997E-01	3.520E-01	3.771E-01	FAIL ABUN
HF-181	-5.203E-01	7.678E-01	8.029E-01	NOT IDENT.
TA-182	4.037E-01	1.385E+00	1.396E+00	NOT IDENT.
RE-183	1.973E+02	2.804E+01	9.324E+01	FAIL ABUN
RE-184	1.523E-01	2.108E+00	2.109E+00	NOT IDENT.
W-188	-1.310E+01	9.371E+01	9.390E+01	NOT IDENT.
IR-192	-2.401E-01	4.757E-01	4.879E-01	NOT IDENT.
HG-203	2.541E-01	4.973E-01	5.103E-01	NOT IDENT.
TL-204	-2.087E+01	6.187E+01	6.258E+01	NOT IDENT.
BI-207	-7.091E-01	7.508E-01	8.160E-01	NOT IDENT.
TL-208	-2.591E-01	4.474E-01	4.624E-01	NOT IDENT.
BI-211	1.399E+00	2.823E+00	2.893E+00	NOT IDENT.
PB-211	-4.329E-01	1.083E+01	1.084E+01	NOT IDENT.

BI-212	6.273E-01	5.365E+00	5.373E+00	NOT IDENT.
PB-212	5.055E-02	6.710E-01	6.714E-01	NOT IDENT.
BI-213	7.660E-01	1.836E+00	1.868E+00	NOT IDENT.
BI-214	-3.153E-01	8.356E-01	8.476E-01	NOT IDENT.
PB-214	1.023E-01	1.026E+00	1.027E+00	FAIL ABUN
RN-219	1.379E+00	6.291E+00	6.322E+00	NOT IDENT.
RN-222	-3.153E-01	8.356E-01	8.476E-01	NOT IDENT.
RA-223	3.840E-01	8.494E+00	8.496E+00	NOT IDENT.
RA-224	-3.072E-01	7.263E+00	7.264E+00	NOT IDENT.
AC-225	-3.952E+00	1.008E+01	1.024E+01	NOT IDENT.
RA-226	1.023E-01	1.026E+00	1.027E+00	FAIL ABUN
AC-227	-5.551E-01	3.102E+00	3.112E+00	NOT IDENT.
TH-227	-5.551E-01	3.102E+00	3.112E+00	NOT IDENT.
AC-228	4.420E+00	4.421E+00	4.849E+00	FAIL ABUN
RA-228	4.420E+00	4.421E+00	4.849E+00	FAIL ABUN
TH-228	5.055E-02	6.710E-01	6.714E-01	NOT IDENT.
TH-229	-9.088E-01	6.098E+00	6.112E+00	FAIL ABUN
TH-230	1.023E-01	1.026E+00	1.027E+00	FAIL ABUN
PA-231	-9.991E-01	5.992E+00	6.009E+00	NOT IDENT.
TH-231	3.840E-01	8.494E+00	8.496E+00	NOT IDENT.
TH-232	4.420E+00	4.421E+00	4.849E+00	FAIL ABUN
PA-233	-2.366E-01	8.792E-01	8.856E-01	NOT IDENT.
PA-234	-7.089E-01	4.893E+00	4.903E+00	NOT IDENT.
PA-234M	-2.896E+01	6.418E+01	6.549E+01	NOT IDENT.
TH-234	9.538E+00	1.873E+01	1.922E+01	NOT IDENT.
U-234	1.023E-01	1.026E+00	1.027E+00	FAIL ABUN
U-235	-3.228E-01	2.037E+00	2.042E+00	NOT IDENT.
NP-237	-2.366E-01	8.792E-01	8.856E-01	NOT IDENT.
NP-238	-1.095E+03	1.598E+03	1.673E+03	NOT IDENT.
U-238	9.538E+00	1.873E+01	1.922E+01	NOT IDENT.
NP-239	-3.295E-01	2.734E+00	2.738E+00	NOT IDENT.
PU-239	4.664E+02	3.498E+03	3.504E+03	NOT IDENT.
AM-243	-2.076E-01	6.260E-01	6.330E-01	NOT IDENT.
CM-243	7.008E-01	1.183E+00	1.224E+00	NOT IDENT.
BK-247	3.763E-03	1.018E+00	1.018E+00	NOT IDENT.
CM-247	2.954E-01	5.824E-01	5.975E-01	NOT IDENT.
CF-249	-1.798E-01	5.842E-01	5.898E-01	NOT IDENT.
CF-251	6.186E-01	1.363E+00	1.391E+00	NOT IDENT.
ANH-511	9.658E-02	4.181E-01	4.203E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	1112.1882	85.43	418.8875	131.20	333.8203
45.60	1212.9191	86.55	397.7790	133.02	349.1454
46.54	1214.7585	86.79	397.8835	133.52	352.7806
49.72	1123.2795	86.94	397.9516	136.00	345.6742
51.35	1180.1584	87.09	380.9475	136.47	351.0507
51.87	1246.3491	87.57	381.1499	140.51	359.2505
52.39	1286.7517	88.03	396.3492	143.76	351.4323
52.97	1297.4314	88.34	396.4846	144.24	349.8128
53.44	1317.4839	88.47	396.5402	145.44	358.0709
54.07	1355.8402	89.96	390.9236	152.43	357.4289
57.36	0.0000	90.64	377.4189	153.25	355.8925
57.53	950.9570	91.11	362.5575	154.21	337.5530
57.98	951.5597	92.59	387.0091	156.02	329.1613
59.27	953.2834	93.35	392.3542	158.56	324.4766
59.32	953.3498	94.56	405.4505	159.00	344.1483
59.54	953.6421	94.65	405.4898	162.33	302.2357
60.96	955.5135	94.67	405.4971	162.66	301.4181
61.17	955.7878	94.87	405.5831	163.33	324.7689
62.93	388.0817	97.43	385.6222	165.86	326.2811
63.29	360.7672	98.43	402.8797	176.31	291.8683
63.58	368.9988	98.44	402.8846	176.60	303.6408
64.28	379.0628	99.53	405.8682	177.52	304.7446
66.73	422.9460	100.11	427.2155	181.07	320.8846
67.24	393.9544	102.03	397.5976	181.52	333.6443
67.68	377.0935	103.18	393.8220	184.41	375.0991
67.75	377.1266	103.37	393.8976	185.72	375.4444
68.89	392.3477	105.21	403.1078	193.51	373.8189
69.67	409.8659	105.31	403.1489	197.03	373.7975
70.82	441.0928	106.12	393.2773	198.01	372.2139
70.83	441.0983	106.47	393.4139	201.83	368.5777
72.81	445.8736	109.28	378.3060	203.43	353.3670
72.87	445.9069	111.00	374.6688	205.31	347.3690
74.66	430.8804	111.76	374.0871	210.85	334.7883
74.82	430.9658	114.06	344.0906	215.65	328.4176
74.97	428.5801	116.30	349.1053	218.12	352.0984
77.11	440.7999	116.74	349.2481	222.11	349.2642
78.74	442.8909	119.76	351.0857	227.09	356.8651
79.69	409.9469	121.12	360.1372	227.38	348.5439
80.03	395.2381	121.22	360.1691	228.16	335.6543
80.12	395.2819	121.78	386.2168	228.18	335.6616
80.19	395.3159	122.06	380.2786	235.69	328.7626
80.57	410.3686	122.92	380.5747	235.96	350.3625
81.00	440.3428	123.07	362.5012	238.63	319.0198
81.07	440.3780	123.68	365.2906	238.98	298.4420
81.75	468.0372	125.81	383.2921	240.99	330.7448
82.47	443.5767	127.23	365.5797	242.00	322.4802
83.79	413.1357	127.91	355.3988	244.70	309.8097
84.00	411.5750	129.30	354.0958	252.40	278.0894

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	276.2629	351.06	258.7252	569.33	113.7799
254.15	0.0000	351.93	267.7905	569.50	113.7842
256.23	297.6586	355.39	0.0000	569.70	114.8765
260.90	317.4536	356.01	274.2783	583.19	133.8956
264.66	300.9818	364.49	282.3500	584.27	130.6787
264.80	301.0075	366.42	282.5967	595.83	126.7995
265.00	299.1343	372.51	265.2783	600.60	113.8558
269.46	298.9203	375.05	251.4954	602.52	0.0000
270.03	301.8754	377.52	258.8196	604.72	129.3554
271.23	283.9120	383.85	264.5906	607.14	106.4174
273.65	268.0200	388.16	264.0745	609.32	120.7601
276.40	261.7083	388.63	268.1756	610.33	109.8185
277.37	255.1331	391.69	277.6513	614.28	119.8530
277.60	258.9999	400.66	275.6644	618.01	90.2714
278.00	240.8276	401.81	276.8145	620.36	126.6937
279.20	253.4619	402.40	272.8145	621.93	131.1634
279.54	265.9937	404.85	272.0736	630.19	0.0000
279.70	266.0163	410.95	263.5797	631.29	106.1250
280.46	284.3773	413.71	303.7676	633.25	107.2936
283.69	259.8486	414.70	313.1034	634.78	104.0250
284.31	251.2667	423.72	287.5651	635.95	101.8491
285.41	274.5340	427.09	294.1287	636.99	102.9902
285.90	272.6765	427.87	292.1643	657.50	113.6667
287.50	273.8770	433.94	293.9178	657.76	113.6750
290.67	265.6397	439.40	304.8910	657.90	0.0000
293.27	0.0000	440.45	308.1249	661.66	112.6921
295.22	270.1393	453.88	341.9787	664.57	0.0000
295.96	264.4354	463.37	365.1459	666.33	87.1533
298.58	282.2496	468.07	333.4080	666.50	87.1565
299.98	253.3376	473.00	301.5703	667.71	0.0000
300.09	253.3482	475.06	319.6195	677.62	86.3242
300.13	253.3535	476.78	257.9617	685.70	78.6646
301.36	271.9678	477.60	253.8459	692.65	74.3198
302.85	272.1786	482.18	251.1319	695.00	91.2733
304.50	256.8403	487.02	234.7416	696.49	80.0397
304.85	256.8833	492.35	208.8362	696.51	80.0397
306.78	294.1477	497.08	211.3118	697.00	75.5413
308.46	302.1983	505.52	203.4844	697.30	71.0365
311.90	289.0504	507.63	0.0000	697.49	67.6587
316.51	266.2227	511.00	177.3424	702.65	73.4053
319.41	271.5053	514.00	206.2355	706.68	80.2737
320.08	280.4199	514.00	206.2355	711.68	95.1084
321.04	249.1631	520.40	163.0232	720.70	86.2731
323.87	266.2088	520.69	172.6260	721.93	0.0000
325.23	282.1127	522.65	0.0000	722.78	78.3718
328.76	271.7661	527.90	167.7260	722.91	78.3746
333.37	255.5907	528.26	136.7656	723.31	86.3350
333.97	252.7031	529.59	157.1385	724.19	102.2644
334.37	252.7552	529.87	0.0000	727.33	72.7865
338.28	274.9854	531.02	151.8688	733.00	76.3210
338.32	274.9910	537.26	126.4745	735.93	68.4033
340.48	263.3915	546.56	0.0000	737.46	82.1191
340.55	263.3969	552.55	151.9238	739.50	98.1392
344.28	259.8945	563.25	153.5560	744.23	89.1274
345.93	256.1261	564.24	148.1993	747.24	75.4800

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	99.5176	954.55	0.0000	1408.01	5.9381
752.31	69.8586	962.31	116.8039	1434.09	4.9707
753.82	93.9483	964.08	125.0035	1435.80	4.9722
756.73	85.9955	966.17	123.2500	1457.56	0.0000
756.80	85.9985	968.97	109.7301	1460.82	1.5979
763.94	76.9753	983.53	102.8132	1489.16	10.0348
765.81	109.1982	984.45	114.6682	1505.03	6.0370
766.42	100.0203	996.26	102.1973	1584.12	7.1342
766.84	81.6344	1001.03	111.4412	1596.21	5.1059
772.60	0.0000	1002.74	110.5720	1620.50	3.0753
776.52	84.1538	1004.73	95.9926	1621.92	3.0760
777.92	98.0253	1021.30	0.0000	1678.03	0.0000
778.90	85.3608	1025.87	88.1777	1690.97	6.2179
783.70	82.0042	1028.54	80.8779	1750.46	0.0000
788.74	85.5866	1037.84	96.7007	1764.49	2.0955
792.07	96.0802	1038.76	0.0000	1770.23	4.1946
795.86	95.0160	1046.59	77.5042	1771.35	5.2441
801.95	97.4907	1048.07	86.7595	1791.20	0.0000
1093.63	100.0254	1049.04	96.0083	1808.65	8.4360
810.29	100.0289	1050.41	95.1166	1810.72	0.0000
810.45	100.0359	1063.66	113.9086	1836.06	7.4106
810.76	90.7366	1077.00	84.5127		
815.77	103.6667	1077.34	91.0197		
818.51	101.4080	1085.87	96.7700		
832.01	104.3937	1093.63	102.5208		
834.85	103.5921	1099.45	108.2473		
835.71	106.2480	1112.07	114.1442		
836.80	0.0000	1112.84	105.7375		
846.75	0.0000	1115.54	80.5200		
846.77	106.5471	1120.29	91.8451		
856.80	117.4100	1120.55	83.4158		
860.56	100.7311	1121.30	78.7397		
871.09	132.0029	1129.67	75.1221		
873.19	102.8240	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	110.0818	1173.23	46.4190		
880.51	108.3361	1177.95	31.8589		
881.60	96.8187	1189.05	31.3605		
883.24	116.4080	1204.77	36.2234		
884.68	110.2256	1221.41	24.8654		
889.28	111.2404	1231.02	23.9532		
894.76	100.6958	1235.36	19.1785		
898.04	107.9096	1238.28	19.1895		
900.72	121.3657	1260.41	0.0000		
903.28	128.5840	1271.87	14.4836		
911.20	108.2531	1274.44	18.3552		
912.08	108.2752	1274.54	19.3213		
923.98	130.1186	1291.59	16.4760		
926.50	138.2795	1298.22	0.0000		
929.11	142.8564	1312.11	15.5654		
935.54	131.3768	1332.49	18.5535		
937.49	133.2352	1362.66	0.0000		
944.13	132.5414	1365.19	5.8934		
946.00	138.9139	1368.63	0.0000		
949.00	147.1367	1384.29	12.8127		

Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
28-FEB-2023 09:23:45

Run Date	Detector	Parameter	Flag	Status	Comments
28-FEB-23	GAM01	All Parameters Passed			
28-FEB-23	GAM02	All Parameters Passed			
28-FEB-23	GAM03	All Parameters Passed			
28-FEB-23	GAM04	Cal Check NLACTVTY-1332	Investigate		
28-FEB-23	GAM05	All Parameters Passed			
28-FEB-23	GAM06	Cal Check PSFWHM-59	Investigate		
28-FEB-23	GAM07	All Parameters Passed			
28-FEB-23	GAM08	All Parameters Passed			
28-FEB-23	GAM09	All Parameters Passed			
23-FEB-23	GAM10	Cal Check may not have run since 28-FEB-2023			Not Run
17-FEB-23	GAM10	Bkg Check may not have run since 28-FEB-2023			Not Run
28-FEB-23	GAM11	All Parameters Passed			
28-FEB-23	GAM12	All Parameters Passed			
28-FEB-23	GAM14	All Parameters Passed			
28-FEB-23	GAM16	All Parameters Passed			
28-FEB-23	GAM18	All Parameters Passed			
28-FEB-23	GAM19	Cal Check PSFWHM-1332	Investigate		
28-FEB-23	GAM20	Cal Check PSFWHM-662	Investigate		
	GAM21	Cal Check may not have run since 28-FEB-2023			Detector locked out.
	GAM21	Bkg Check may not have run since 28-FEB-2023			Detector locked out.
	GAM22	Cal Check may not have run since 28-FEB-2023			Detector locked out.
05-APR-20	GAM22	Bkg Check may not have run since 28-FEB-2023			Detector locked out.
28-FEB-23	GAM23	Cal Check NLACTVTY-1332	Investigate		
28-FEB-23	GAM24	All Parameters Passed			
28-FEB-23	GAM27	All Parameters Passed			
28-FEB-23	GAM28	All Parameters Passed			
28-FEB-23	GAM29	All Parameters Passed			
28-FEB-23	GAM30	All Parameters Passed			
28-FEB-23	GAM31	All Parameters Passed			
28-FEB-23	GAM32	Cal Check PSFWHM-1332	Investigate		
28-FEB-23	GAM33	Bkg Check BACKRATE	Investigate		
28-FEB-23	GAM34	All Parameters Passed			
28-FEB-23	GAM36	Cal Check NLACTVTY-59	Investigate		
28-FEB-23	GAM36	Cal Check NLACTVTY-662	Investigate		
28-FEB-23	GAM38	All Parameters Passed			
28-FEB-23	GAM40	All Parameters Passed			
28-FEB-23	GAM41	All Parameters Passed			
28-FEB-23	GAM43	All Parameters Passed			
31-DEC-22	GAM44	Cal Check may not have run since 28-FEB-2023			Detector locked out.

15-JAN-23	GAM44	Bkg Check may not have run since 28-FEB-2023			Detector locked out.
28-FEB-23	GAM45	All Parameters Passed			
28-FEB-23	GAM46	All Parameters Passed			
28-FEB-23	GAM47	All Parameters Passed			
28-FEB-23	GAM53	Cal Check NLACTVTY-662	Investigate		
28-FEB-23	XRAY1	Cal Check NLACTVTY-29	Investigate		
28-FEB-23	XRAY2	All Parameters Passed			
28-FEB-23	XRAY3	All Parameters Passed			
28-FEB-23	XRAY4	Cal Check PSFWHM-29	Investigate		
28-FEB-23	XRAY4	Cal Check PSFWHM-34	Action	Approved	Low FWHM, approved for use.
28-FEB-23	XRAY4	Cal Check PSFWHM-40	Action	Approved	Low FWHM, approved for use.
28-FEB-23	XRAY4	Cal Check NLACTVTY-29	Investigate		
28-FEB-23	XRAY6	All Parameters Passed			
28-FEB-23	XRAY7	All Parameters Passed			

APPROVAL DATE: 28-FEB-2023 APPROVAL TIME: 09:51:22

APPROVED BY: Rebekah Futch PROCEDURE # GL-RAD-I-001

The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

Runlogs

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 2379916**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
609724001	SAMPLE	RXF2	GAM28	FEB-28-23 05:06:13	DONE	CAN	02-JUN-22 00:00
609724002	SAMPLE	RXF2	GAM30	FEB-28-23 05:06:43	DONE	CAN	19-SEP-22 00:00
609724003	SAMPLE	RXF2	GAM38	FEB-28-23 05:07:24	DONE	CAN	31-MAY-22 00:00
609724004	SAMPLE	RXF2	GAM40	FEB-28-23 05:08:05	DONE	CAN	25-OCT-22 00:00
609724005	SAMPLE	RXF2	GAM43	FEB-28-23 05:08:59	DONE	CAN	26-JUL-22 00:00
609724006	SAMPLE	RXF2	GAM02	FEB-28-23 05:20:47	DONE	CAN	23-SEP-22 00:00
1205313910	MB	RXF2	GAM33	FEB-28-23 05:21:28	DONE	CAN	25-JUL-22 00:00
1205313911	DUP	RXF2	GAM03	FEB-28-23 06:51:01	DONE	CAN	12-OCT-22 00:00
1205313912	LCS	RXF2	GAM01	FEB-28-23 06:58:38	DONE	CAN	14-JUN-22 00:00

Hometown People. Hometown Power.

Environmental Laboratory
1232 Haco Drive
Lansing
Michigan, 48910

Phone: (517)702-6372

CHAIN OF CUSTODY

Lab Work Order Number L301211

Client Name	Project Name
BWL - Erickson Station	Erickson Closure Ash Characterization
Client Contact: Cheryl Louden	Project Number
Address: 3725 S. Canal	Project Description
City: Lansing	PO Number
State/Zip: MI, 48917	Shipped By
Phone: (517) 702-6396 / Fax: (517) 702-6373	Tracking Number
Sampler: HDR Bryce Burkett 2252412944	

Requested Analyses: Ra226&228; Metals; Chloride, Sulfate, Fluoride; Total Solids

Requested Turn Around

Rush requests subject to additional charge.

Rush requests subject to lab approval.

Sample Name or Field ID	Sampled Date	Sampled Time	Sample Type Grab/Composite	Matrix Code	Container Count	Preservation Code										Sample Comments
Retention Basin A	01/20/23	1100	G	S	1	x	x	x	x							
Retention Basin B	↓	↓	G	S	1	x	x	x	x							
Retention Basin C	↓	↓	G	S	1	x	x	x	x							
Clearwater Pond A	↓	1130	G	S	1	x	x	x	x							
Clearwater Pond B	↓	↓	G	S	1	x	x	x	x							
Clearwater Pond C	↓	↓	G	S	1	x	x	x	x							

Relinquished By	Date/Time	Received By	Date/Time
B Burkett	12:35 1/26/23	J Caporale	1235 01/26/23
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

Cooler Numbers and Temperatures: Default Cooler

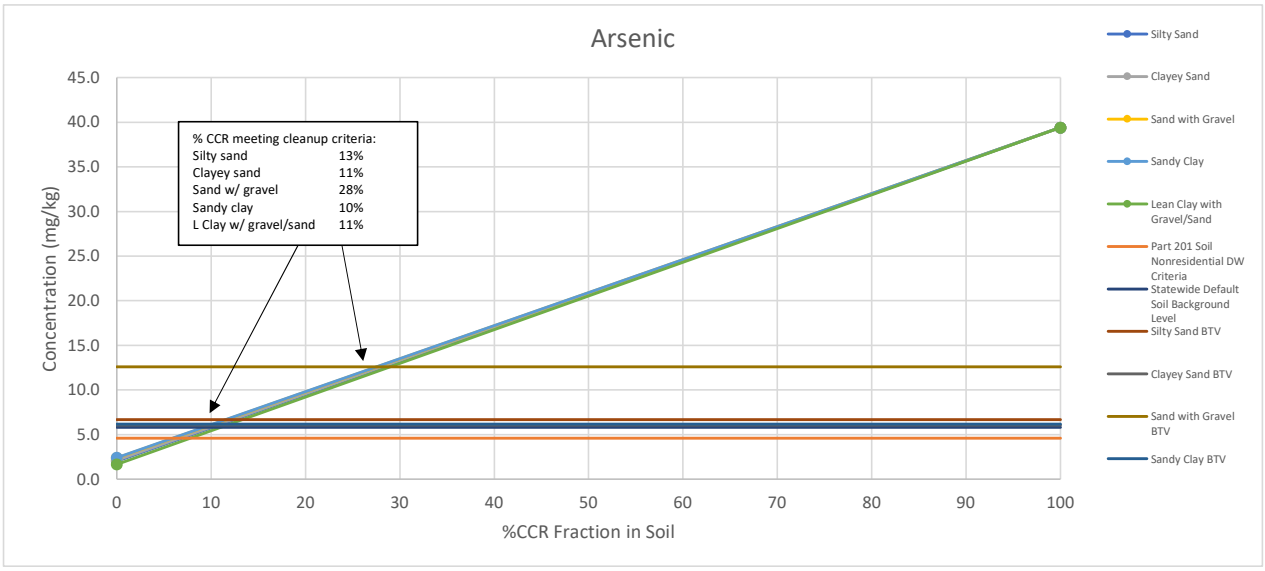
Comments

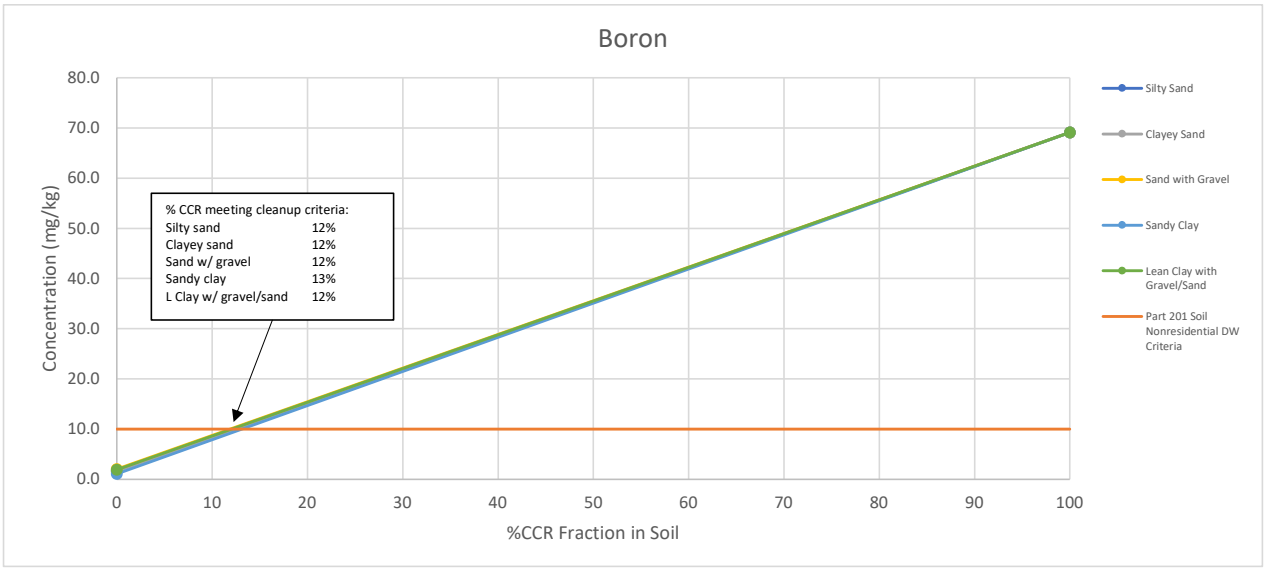
Matrix Codes: S=Solid

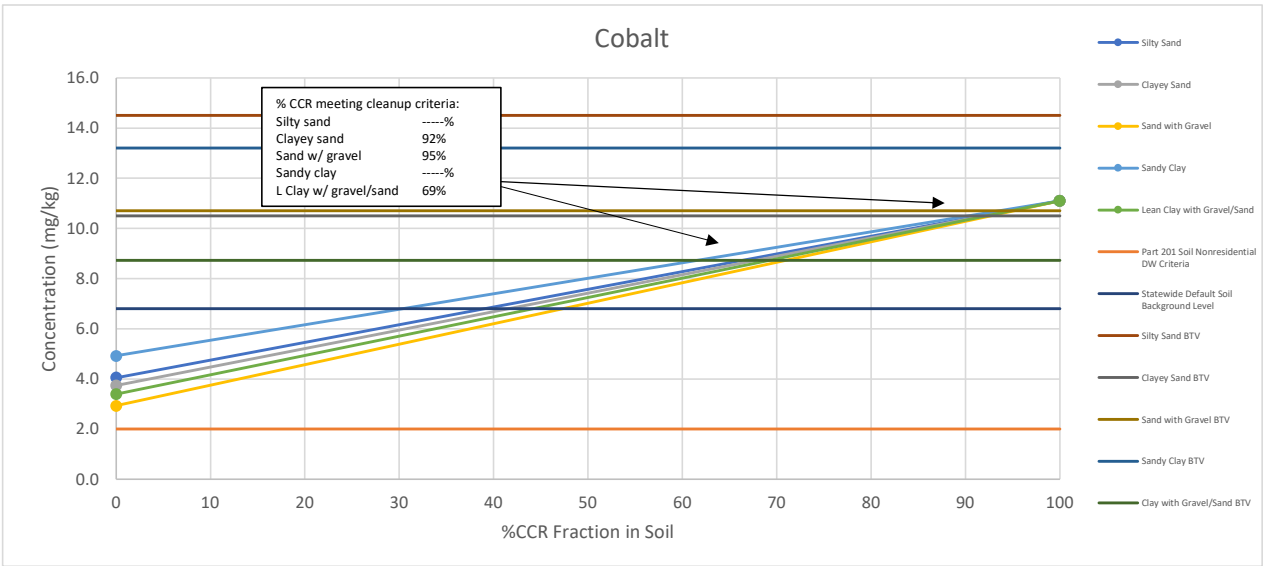
Preserv. Codes: b=0.5% HNO3

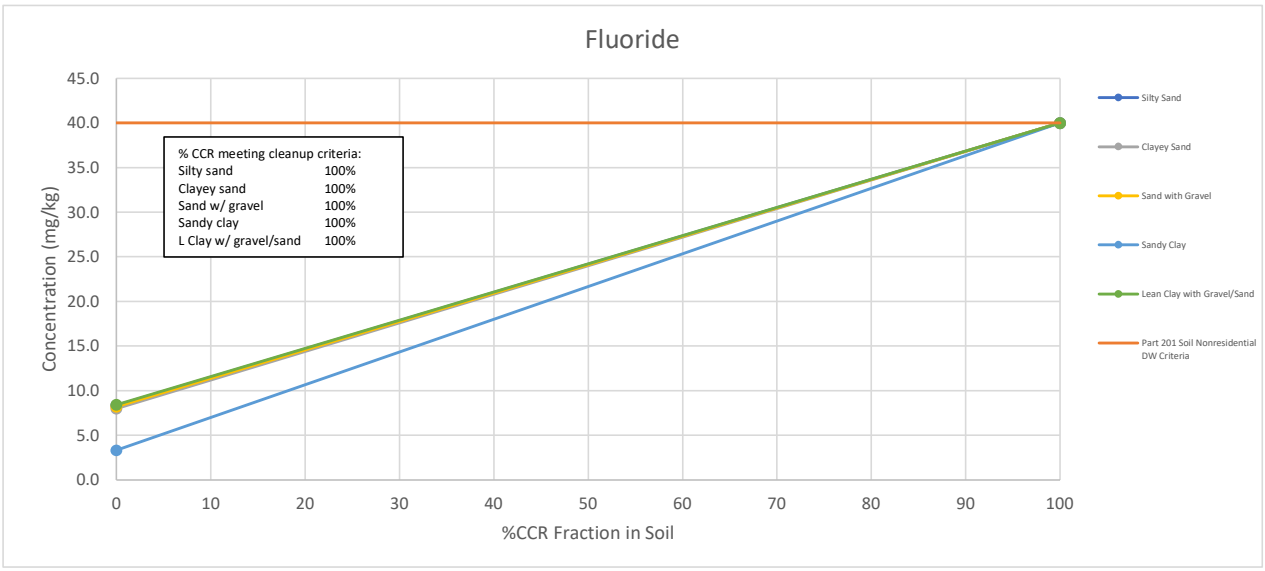
Attachment 2

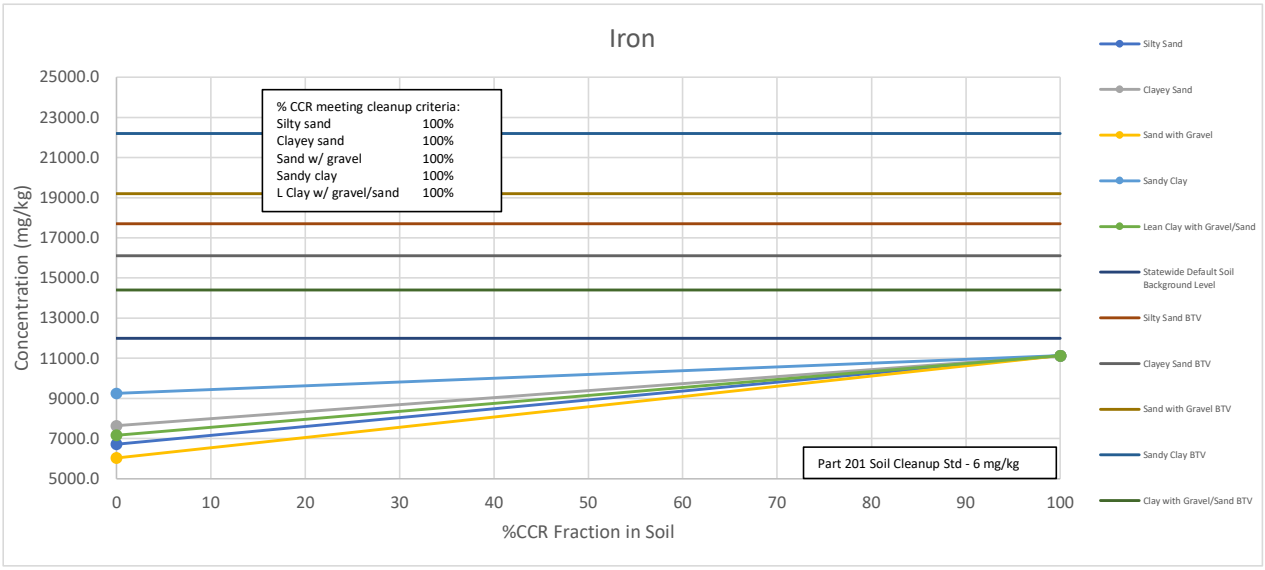
Microscopy Threshold Graphs

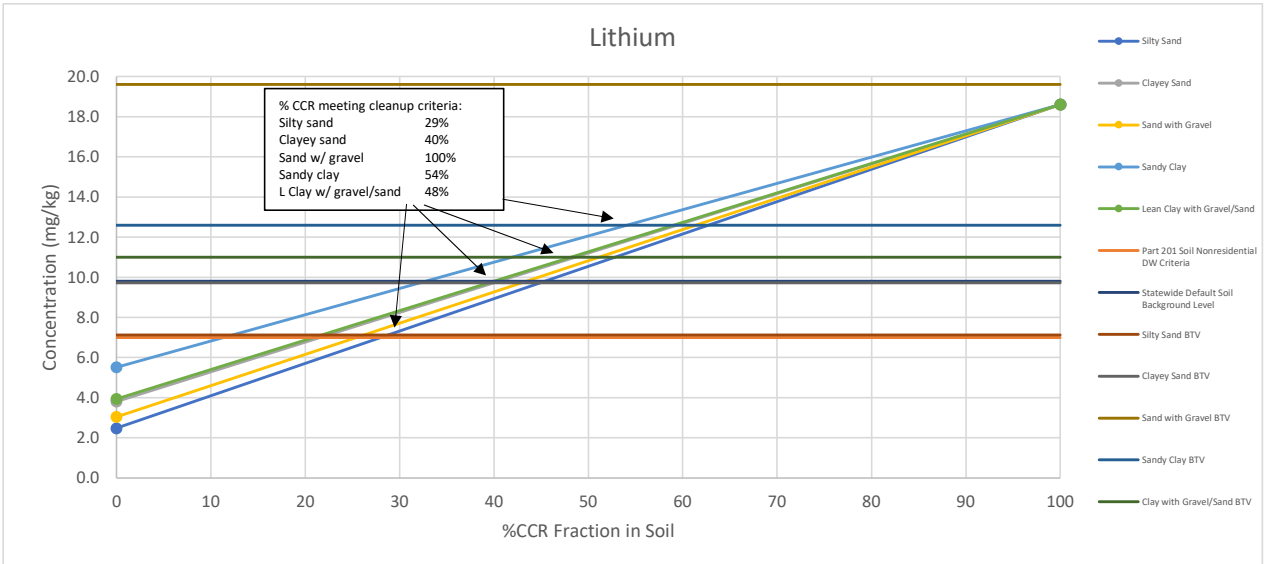

Arsenic
% CCR meeting cleanup criteria:
Silty sand 13%
Clayey sand 11%
Sand w/ gravel 28%
Sandy clay 10%
L Clay w/ gravel/sand 11%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria
Statewide Default Soil Background Level
Silty Sand BTV
Clayey Sand BTV
Sand with Gravel BTV
Sandy Clay BTV

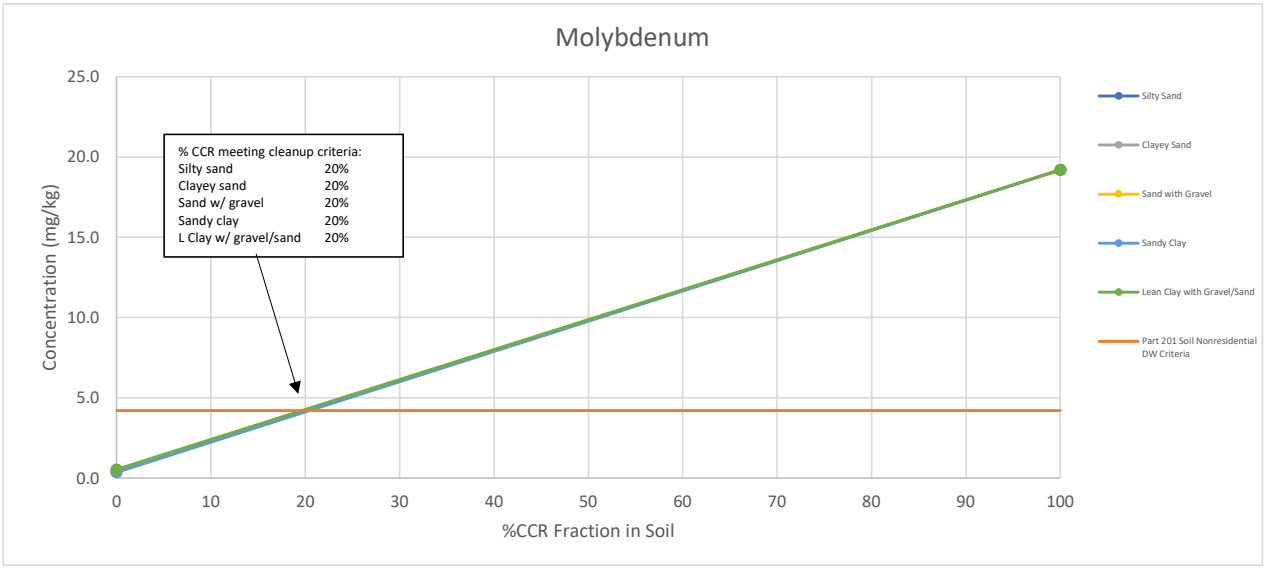

Boron
% CCR meeting cleanup criteria:
Silty sand 12%
Clayey sand 12%
Sand w/ gravel 12%
Sandy clay 13%
L Clay w/ gravel/sand 12%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria

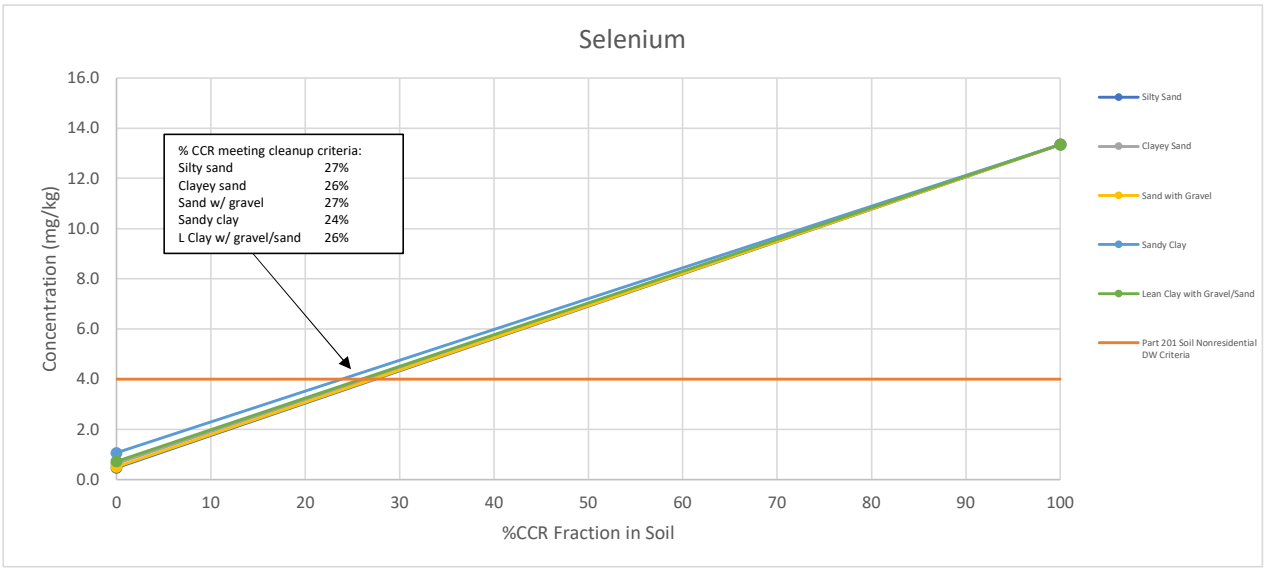

Cobalt
% CCR meeting cleanup criteria:
Silty sand -----%
Clayey sand 92%
Sand w/ gravel 95%
Sandy clay -----%
L Clay w/ gravel/sand 69%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria
Statewide Default Soil Background Level
Silty Sand BTV
Clayey Sand BTV
Sand with Gravel BTV
Sandy Clay BTV
Clay with Gravel/Sand BTV


Fluoride
% CCR meeting cleanup criteria:
Silty sand 100%
Clayey sand 100%
Sand w/ gravel 100%
Sandy clay 100%
L Clay w/ gravel/sand 100%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria


Iron
% CCR meeting cleanup criteria:
Silty sand 100%
Clayey sand 100%
Sand w/ gravel 100%
Sandy clay 100%
L Clay w/ gravel/sand 100%
Part 201 Soil Cleanup Std - 6 mg/kg
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Statewide Default Soil Background Level
Silty Sand BTV
Clayey Sand BTV
Sand with Gravel BTV
Sandy Clay BTV
Clay with Gravel/Sand BTV


Lithium
% CCR meeting cleanup criteria:
Silty sand 29%
Clayey sand 40%
Sand w/ gravel 100%
Sandy clay 54%
L Clay w/ gravel/sand 48%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria
Statewide Default Soil Background Level
Silty Sand BTV
Clayey Sand BTV
Sand with Gravel BTV
Sandy Clay BTV
Clay with Gravel/Sand BTV


Molybdenum
% CCR meeting cleanup criteria:
Silty sand 20%
Clayey sand 20%
Sand w/ gravel 20%
Sandy clay 20%
L Clay w/ gravel/sand 20%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria


Selenium
% CCR meeting cleanup criteria:
Silty sand 27%
Clayey sand 26%
Sand w/ gravel 27%
Sandy clay 24%
L Clay w/ gravel/sand 26%
Concentration (mg/kg)
%CCR Fraction in Soil
Silty Sand
Clayey Sand
Sand with Gravel
Sandy Clay
Lean Clay with Gravel/Sand
Part 201 Soil Nonresidential DW Criteria

Attachment 3

Seepage and Stability Analyses Supplement

Memo – Supplement No. 1

Date: Wednesday, April 19, 2023

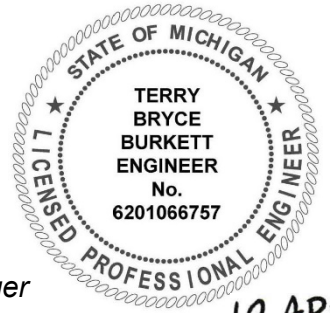
Project: Erickson Power Station Forebay, Retention Basin, and Clear Water Pond Impoundment Closure

Prepared for: Lansing Board of Water & Light
Erickson Power Station
3725 South Canal Road
Lansing, Michigan 48917

From:

Iman Shafii, Ph.D., P.E.
Geotechnical Engineer

Bryce Burkett, P.E.
Senior Geotechnical Project Manager



19 APR 2023

Subject: Retention Basin and Clear Water Pond Seepage and Stability Analyses

1. Introduction

Erickson Power Station has been closed as part of the Lansing Board of Water & Light's (BWL) move to cleaner energy sources. HDR Michigan, Inc. (HDR) is assisting BWL with assessing the stability of the embankments of the Retention Basin and Clear Water Pond adjacent to Lake Delta during the impoundment closure activities which includes dewatering activities and coal combustion residuals (CCR) removal as part of the impoundment closure program. Figure 1 shows an aerial view of the current CCR impoundments configuration.

Figure 1. Google Earth Image of CCR Impoundments

HDR previously performed stability and seepage analyses at two selected cross-sections along the embankment of the Retention Basin and Clear Water Pond. The results of those analyses were included in a Retention Basin and Clear Water Pond Seepage and Stability Analyses memorandum dated September 29th, 2022. The results of the previous analyses determined that the factor of safety for seepage was not adequate for the Retention Basin embankment; therefore, consideration should be given to installing a well point system below the embankment crest separating the Retention Basin from Lake Delta. The intent of the well point system was to lower the seepage line to mitigate possible effects of upward gradient and heave potential at the interior embankment toe of the Retention Basin adjacent to Lake Delta. Additionally, the results of the previous analyses showed that the Clear Water Pond slopes were adequate to obtain the minimum factor of safety for seepage and global stability during dewatering and excavation, and therefore, no well point system was required.

Considering the results from the previous seepage and stability analyses, a geotechnical field investigation was commenced to provide more accurate geotechnical and piezometric data of the Retention Basin embankment adjacent to Lake Delta. In the previous analyses, available data near the embankment was used to develop the geotechnical profile. However, this data was not performed within the actual embankment analyzed and additional geotechnical data was collected to update the analyses.

Two piezometers, designated as RBPZ-1 and RBPZ-2, were installed on March 10, 2023 by SME in the embankment that separates the Retention Basin from Lake Delta. The purpose of the piezometer installation was to verify the previous assumptions regarding ground water level and assumed stratigraphy used in seepage and stability analyses presented in the original memorandum. Figure 2 shows a plan view of the study area with approximate locations of the recently installed piezometers.

This memorandum is intended to supplement HDR's previous memorandum and to provide the recently installed piezometer logs and subsequent updates to the seepage analyses for the

Retention Basin embankment. The procedures and results of the seepage analysis are presented in this memorandum report.

Figure 2. Approximate Location of Piezometers

2. Soil Information Used for Seepage Analysis

The soil stratigraphy encountered in the two recently installed piezometers (i.e., RBPZ-1 and RBPZ-2) was generally consistent with the stratigraphy used in our previous seepage and stability analyses. The piezometer logs used in the development of subsurface parameters for the seepage analysis are included in the geotechnical summary letter provided in Attachment A.

Table 1 shows the hydraulic conductivity parameters used for the seepage analysis for Retention Basin. The stratigraphy and hydraulic conductivity parameters were selected for each soil stratum based on the laboratory and field test data collected during previous field explorations, previous geotechnical studies, and review of piezometers RBPZ-1 and RBPZ-2 in the vicinity of Retention Basin. It should be noted that the following revisions are made to the stratigraphy and seepage parameters compared to the previous HDR memo dated September 29th, 2022:

- A 4-ft thick, 10-ft wide, cutoff trench was added underneath the embankment centerline depicting the as-built drawings of the embankment from the 1970 impoundment design.
- K_v values were revised to $1x10^{-7}$ cm/sec (3.28e-9 ft/sec) for all cohesive soils, based on review of previous laboratory testing data on similar materials.
- K_h values were revised to $4x10^{-7}$ cm/sec (1.31e-8 ft/sec) for native cohesive layers, based on review of previous laboratory testing data on similar materials.

- K_v/K_h ratio was revised from 1.0 to 0.25 for native cohesive layers, as they were historically deposited horizontally in sheet-like structure over time. Due to this layered structure, the vertical permeability is therefore typically lower in the vertical direction than in the horizontal direction.

Table 1: Soil Stratigraphy and Hydraulic Conductivity Parameters Used for Retention Basin

Stratum/ Material	Bottom Elevation (feet)	Total Unit Weight (pcf)	K_h, Horizontal (ft/sec)	K_v/K_h Ratio	Compressibility (psf)
Embankment Fill	871	120	3.28e-9	1.0	4.79e-7
Cutoff Trench (1)	866	120	3.28e-9	1.0	4.79e-7
Sandy Clay 1	870	125	1.31e-8	0.25	4.79e-7
Sandy Silt	869	125	6.56e-5	1.0	4.79e-7
Sandy Clay 1	865.5	125	1.31e-8	0.25	4.79e-7
Sandy Clay 2	856	125	1.31e-8	0.25	4.79e-7
Sand with Silt	830	125	6.56e-5	1.0	4.79e-7

Note:
(1) The cutoff trench is 10-ft wide and is located only underneath the embankment centerline.

3. Seepage Analyses

A two-dimensional embankment seepage analysis was performed using SEEP/W 2022.1 for the Retention Basin. Water level on the upstream side of the embankment (i.e., Lake Delta) was assumed at El. 883 feet. It should be noted that throughout the project duration, the water surface of Lake Delta will be monitored and not allowed to reach above El. 882.5 feet. The primary objective for performing the seepage analysis herein was to estimate hydraulic gradients, specifically exit gradients through downstream upper stratum.

The seepage analyses were completed for steady-state flow conditions, with no consideration of storm surge duration, as required in *EM 1110-2-1913* (United States Army Corps of Engineers 2000). Saturated flow conditions were evaluated for each soil type. The results of the seepage analysis are shown in Table 2, with output results provided in Attachment B.

Table 2: Result of Seepage Analysis for Retention Basin

Seepage Analysis Section	Upstream Water Level	Gradient Across Protected Side Blanket	Gradient Factor of Safety	Meet Criteria Factor of Safety of 2.0?
Retention Basin	El. 883 ft	0.23	4.0	Yes

4. Summary

HDR previously performed stability and seepage analyses at two selected cross-sections along the embankment of the Retention Basin and Clear Water Pond. The results of the previous analyses determined that the factor of safety for seepage was not adequate for the Retention

Basin embankment; therefore, consideration should be given to installing a well point system below the embankment crest separating the Retention Basin from Lake Delta. The intent of the well point system was to lower the seepage line to mitigate possible effects of upward gradient and heave potential at the interior embankment toe of the Retention Basin adjacent to Lake Delta.

The updated seepage analysis presented herein, using updated geotechnical parameters and piezometric levels from piezometers RBPZ-1 and RBPZ-2, indicates that at the Retention Basin, the upward gradient and heave potential at the toe of the embankment meet the minimum required factor of safety, and therefore, installing a well point system, as previously recommended by HDR, is not required. Further monitoring of the groundwater levels in the piezometers will continue through the duration of the project as well as daily monitoring of the embankments adjacent to Lake Delta.

Attachments:
Attachment A: Geotechnical Summary Letter - SME
Attachment B: SEEP/W Output for Retention Basin

Attachment A
Geotechnical Summary Letter - SME

The Kramer Building
43980 Plymouth Oaks Blvd.
Plymouth, MI 48170-2584

T (734) 454-9900

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March 16, 2023

Tony Landosky
TL Contracting, Inc.
16803 Industrial Parkway
Lansing, Michigan 48906

Via E-Mail: tony@tlcontractinginc.org

RE: Retention Basin Monitoring Wells
LBWL Erickson Station | Ash Impoundments Closure
3725 South Canal Road
Delta Township, Michigan 48917
SME Project No. 092330.00

Dear Mr. Landosky:

SME has completed the geotechnical exploration for the requested monitoring wells at the LBWL Erickson Station in Delta Township, Michigan. We performed our services based on your authorization of SME Proposal No. P00701.23, dated February 27, 2023.

This letter transmits the geotechnical data obtained for the project, including logs for the borings / wells and a diagram depicting the site features. In preparation of this transmittal, we reviewed a drawing prepared by HDR titled, “Phase 1 Impoundment Dewatering Plan,” dated January 31, 2023.

SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located on the grounds of the LBWL Erickson Station at 3725 Canal Road in Delta Township, Michigan, and consists of an existing retention basin on the southeastern portion of the property. The project includes dewatering a former impoundment pond located adjacent to the retention basin. We understand the contractor is responsible for installing a minimum of two additional groundwater monitoring wells near the retention basin prior to dewatering.

FIELD EXPLORATION

The field exploration consisted of drilling two borings (RB1 and RB2) and installing two observation wells (OW-RB1 and OW-RB2) on March 10, 2023. The approximate boring / well locations are depicted on the Boring Location Plan (Figure No. 1) included in the attachments.

SME and TL Contracting jointly determined the planned number, location, and depths of the borings / wells. SME recorded the as-drilled boring / well locations and ground surface elevations to the nearest 0.1-foot using a Leica GPS unit. Utility clearance near the planned work areas was performed by a private underground locating service (GPRS) using geophysical (i.e., indirect) methods including ground penetrating radar and electromagnetic line locating.

The borings were advanced to a depth of 20 feet below the existing ground surface with a truck-mounted, rotary-type drill rig using hollow-stem augers. The borings included continuous soil sampling based upon the Split-Barrel Sampling procedure. Portions of the recovered split-barrel samples were sealed and transported to our lab for further observation and testing. Information regarding the drilling and sampling is provided on the boring logs in the attachments.

Groundwater level measurements in the boreholes were recorded while drilling each boring. An open-standpipe observation well was installed within each of the drilled boreholes upon completion of drilling. The wells consisted of 2.0-inch inner diameter PVC with slotted-screen at the bottom, and riser pipe extending from the screen to existing grade. The well annulus was backfilled with filter sand to a depth above the screen followed by a bentonite chips to existing grade.

LABORATORY TESTING

The laboratory testing program consisted of visually classifying recovered samples in general accordance with the Unified Soil Classification System (USCS), ASTM D-2488 along with hand penetrometer and torvane shear strength tests. The attached Laboratory Testing Procedures provides descriptions of commonly performed laboratory tests. The attached boring logs summarize our field observation and laboratory test results. Explanations of symbols and terms used on the boring logs are provided on the attached Boring Log Terminology sheet.

Soil samples retained over a long time, even sealed in jars, are subject to moisture loss and are no longer representative of the conditions initially encountered in the field. Therefore, soil samples are normally retained in our laboratory and are disposed of after 60 days, unless we are instructed otherwise.

SOIL CONDITIONS

The soil conditions encountered at the borings generally consisted of existing fill underlain by natural clays (containing interbedded granular seams and layers) extending to the explored depths.

The existing fill extended to depths of about 9 feet to 9.5 feet below existing site grades. The existing fill consisted of sand within the upper approximate 1-foot followed by clay soils containing various amounts of sand.

Natural lean clays were encountered underlying the existing fill and extended to the explored depths. The lean clays exhibited medium to hard consistencies and had moisture contents ranging from about 10 to 28 percent. A granular sand silt layer was encountered within the lean clays at boring RB1. A medium-dense sandy silt layer was encountered in RB1 from 14 feet to 15 feet below ground surface. At boring RB2, granular sand seams were encountered within the overall cohesive profile.

The soil descriptions are based on visual classification of the soils encountered. Soil conditions may vary between or away from the boring locations. Please refer to the boring logs for the soil conditions encountered at the specific boring locations.

GROUNDWATER CONDITIONS

Groundwater was encountered during drilling at depths of 9.5 feet (at boring RB1) and 17 feet (at boring RB2) below existing ground surface. Post-drilling groundwater measurements were not obtained for this exploration.

Groundwater levels, perched groundwater conditions, and the rate of infiltration into excavations should be expected to fluctuate throughout the year, based on variations in precipitation, evaporation, run-off, and other factors. The groundwater levels indicated by the borings represent conditions at the time the readings were taken. The actual groundwater levels at the time of construction may vary from those conditions noted on the boring logs.

LIMITATIONS

The estimated soil profiles and groundwater levels included on the boring logs and observation well logs are generalized descriptions of the conditions encountered at the boring and observation well locations. The stratification depths shown on the attached boring logs indicate a zone of transition from one soil type to another and not a location of exact change. The soil and groundwater conditions may vary between and away from these locations, from those conditions noted on the logs. Also, the groundwater levels may exhibit seasonal changes.

Engineering analysis recommendations were not requested or included as part of the current scope of services. Therefore, SME is not responsible for the suitability of the field exploration, scope of services, or the interpretation of our boring logs by others. SME can assist you with additional geotechnical evaluation and engineering services, as well as on-site services during construction, if desired.

We appreciate the opportunity to be of service. If you have questions regarding this letter, or if you require additional information, please contact us.

Sincerely,

SME

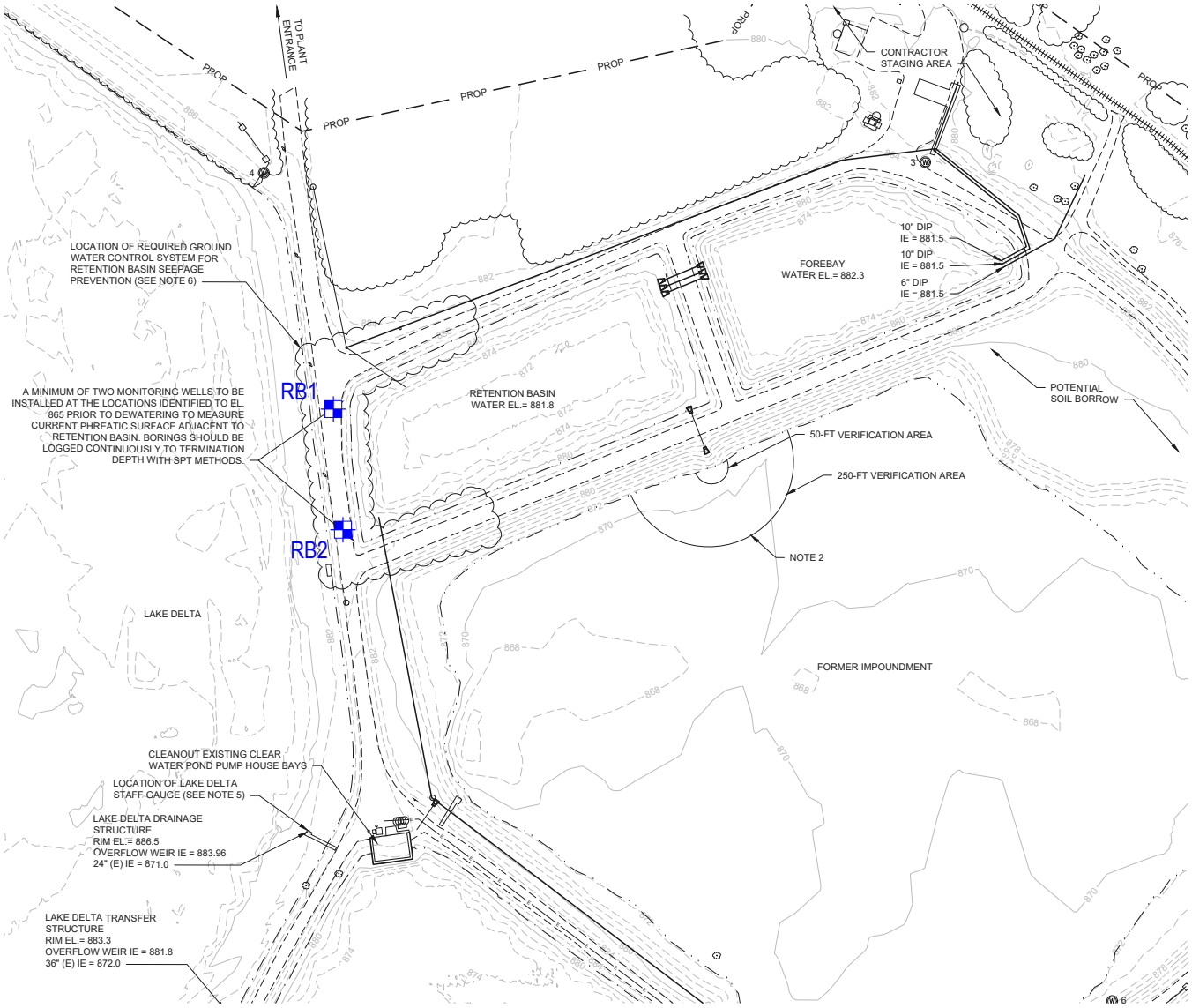
PREPARED BY:

Alex M. Dodson, EI
Staff Engineer

REVIEWED BY:

Jeremy S. Wahlstrom, PE
Senior Project Engineer

Attachments:
Boring Location Plan (Figure No. 1)
Boring Log Terminology
Boring Logs (RB1 and RB2)
Observation Well Logs (OW-RB1 and OW-RB2)
Important Information About This Geotechnical-Engineering Report
General Comments
Laboratory Testing Procedures



LEGEND

APPROXIMATE WELL LOCATION

0' 250' 500'

GRAPHIC SCALE: 1" = 250'

NOTE:
DRAWING INFORMATION TAKEN FROM A DRAWING TITLED, "PHASE 1 IMPOUNDMENT DEWATERING PLAN," (DRAWING 140-952-6), LATEST ISSUE DATE OF 01-31-23, PREPARED BY HDR.

LOCATION MAP
NOT TO SCALE

No.	Revision Date		
		Date	03-15-23
		Drawn By	JSW
		Designed By	JSW
		Scale	1" = 250'
		Project	092330.00

BORING LOCATION PLAN
LBWL ERICKSON POWER STATION
ASH IMPOUNDMENTS CLOSURE
DELTA TOWNSHIP, MI

SME
www.sme-usa.com

Figure No. 1

BORING LOG TERMINOLOGY

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOIL (more than 50% of material is larger than No. 200 sieve size.)			
GRAVEL More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravel (Less than 5% fines)	GW	Well-graded gravel; gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravel; gravel-sand mixtures, little or no fines
	Gravel with fines (More than 12% fines)	GM	Silty gravel; gravel-sand-silt mixtures
		GC	Clayey gravel; gravel-sand-clay mixtures
SAND 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sand (Less than 5% fines)	SW	Well-graded sand; sand-gravel mixtures, little or no fines
		SP	Poorly graded sand; sand-gravel mixtures, little or no fines
	Sand with fines (More than 12% fines)	SM	Silty sand; sand-silt-gravel mixtures
		SC	Clayey sand; sand–clay-gravel mixtures
FINE-GRAINED SOIL (50% or more of material is smaller than No. 200 sieve size)			
SILT AND CLAY Liquid limit less than 50%		ML	Inorganic silt; sandy silt or gravelly silt with slight plasticity
		CL	Inorganic clay of low plasticity; lean clay, sandy clay, gravelly clay
		OL	Organic silt and organic clay of low plasticity
SILT AND CLAY Liquid limit 50% or greater		MH	Inorganic silt of high plasticity, elastic silt
		CH	Inorganic clay of high plasticity, fat clay
		OH	Organic silt and organic clay of high plasticity
HIGHLY ORGANIC SOIL		PT	Peat and other highly organic soil

OTHER MATERIAL SYMBOLS

Topsoil, Void, Sandstone, Asphalt Concrete, Glacial Till, Siltstone, Aggregate Base, Coal, Limestone, Portland Cement Concrete, Shale, Fill

LABORATORY CLASSIFICATION CRITERIA

GW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with PI greater than 7	
SW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for SW	
SM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with PI greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent……GW, GP, SW, SP
More than 12 percent……GM, GC, SM, SC
5 to 12 percent……Cases requiring dual symbols

- SP-SM or SW-SM (SAND with Silt or SAND with Silt and Gravel)
- SP-SC or SW-SC (SAND with Clay or SAND with Clay and Gravel)
- GP-GM or GW-GM (GRAVEL with Silt or GRAVEL with Silt and Sand)
- GP-GC or GW-GC (GRAVEL with Clay or GRAVEL with Clay and Sand)

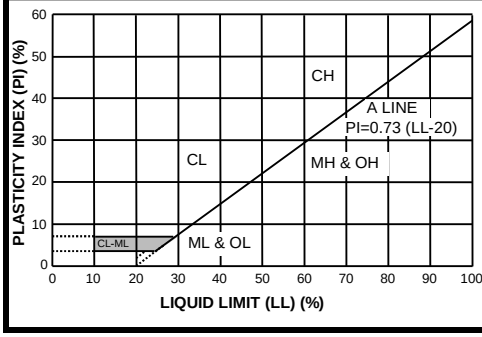
If the fines are CL-ML:

- SC-SM (SILTY CLAYEY SAND or SILTY CLAYEY SAND with Gravel)
- SM-SC (CLAYEY SILTY SAND or CLAYEY SILTY SAND with Gravel)
- GC-GM (SILTY CLAYEY GRAVEL or SILTY CLAYEY GRAVEL with Sand)

PARTICLE SIZES

Boulders	-	Greater than 12 inches
Cobbles	-	3 inches to 12 inches
Gravel- Coarse	-	3/4 inches to 3 inches
Fine	-	No. 4 to 3/4 inches
Sand- Coarse	-	No. 10 to No. 4
Medium	-	No. 40 to No. 10
Fine	-	No. 200 to No. 40
Silt and Clay	-	Less than (0.074 mm)

PLASTICITY CHART



VISUAL MANUAL PROCEDURE

When laboratory tests are not performed to confirm the classification of soils exhibiting borderline classifications, the two possible classifications would be separated with a slash, as follows:

For soils where it is difficult to distinguish if it is a coarse or fine-grained soil:

- SC/CL (CLAYEY SAND to Sandy LEAN CLAY)
- SM/ML (SILTY SAND to SANDY SILT)
- GC/CL (CLAYEY GRAVEL to Gravelly LEAN CLAY)
- GM/ML (SILTY GRAVEL to Gravelly SILT)

For soils where it is difficult to distinguish if it is sand or gravel, poorly or well-graded sand or gravel; silt or clay; or plastic or non-plastic silt or clay:

- SP/GP or SW/GW (SAND with Gravel to GRAVEL with Sand)
- SC/GC (CLAYEY SAND with Gravel to CLAYEY GRAVEL with Sand)
- SM/GM (SILTY SAND with Gravel to SILTY GRAVEL with Sand)
- SW/SP (SAND or SAND with Gravel)
- GP/GW (GRAVEL or GRAVEL with Sand)
- SC/SM (CLAYEY to SILTY SAND)
- GM/GC (SILTY to CLAYEY GRAVEL)
- CL/ML (SILTY CLAY)
- ML/CL (CLAYEY SILT)
- CH/MH (FAT CLAY to ELASTIC SILT)
- CL/CH (LEAN to FAT CLAY)
- MH/ML (ELASTIC SILT to SILT)

DRILLING AND SAMPLING ABBREVIATIONS

2ST	–	Shelby Tube – 2" O.D.
3ST	–	Shelby Tube – 3" O.D.
AS	–	Auger Sample
GS	–	Grab Sample
LS	–	Liner Sample
NR	–	No Recovery
PM	–	Pressuremeter
RC	–	Rock Core diamond bit. NX size, except where noted
SB	–	Split Barrel Sample 1-3/8" I.D., 2" O.D., except where noted
VS	–	Vane Shear
WS	–	Wash Sample

OTHER ABBREVIATIONS

WOH	–	Weight of Hammer
WOR	–	Weight of Rods
SP	–	Soil Probe
PID	–	Photo Ionization Device
FID	–	Flame Ionization Device

DEPOSITIONAL FEATURES

Parting	–	as much as 1/16 inch thick
Seam	–	1/16 inch to 1/2 inch thick
Layer	–	1/2 inch to 12 inches thick
Stratum	–	greater than 12 inches thick
Pocket	–	deposit of limited lateral extent
Lens	–	lenticular deposit
Hardpan/Till	–	an unstratified, consolidated or cemented mixture of clay, silt, sand and/or gravel, the size/shape of the constituents vary widely
Lacustrine	–	soil deposited by lake water
Mottled	–	soil irregularly marked with spots of different colors that vary in number and size
Varved	–	alternating partings or seams of silt and/or clay
Occasional	–	one or less per foot of thickness
Frequent	–	more than one per foot of thickness
Interbedded	–	strata of soil or beds of rock lying between or alternating with other strata of a different nature

DESCRIPTION OF RELATIVE QUANTITIES

The visual-manual procedure uses the following terms to describe the relative quantities of notable foreign materials, gravel, sand or fines:

Trace	–	particles are present but estimated to be less than 5%
Few	–	5 to 10%
Little	–	15 to 25%
Some	–	30 to 45%
Mostly	–	50 to 100%

CLASSIFICATION TERMINOLOGY AND CORRELATIONS

Cohesionless Soils

Relative Density	N_{60} (N-Value) (Blows per foot)
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	51 to 80
Extremely Dense	Over 81

Cohesive Soils

Consistency	N_{60} (N-Value) (Blows per foot)	Undrained Shear Strength (kips/ft^2)
Very Soft	<2	0.25 or less
Soft	2 - 4	> 0.25 to 0.50
Medium	5 - 8	> 0.50 to 1.0
Stiff	9 - 15	> 1.0 to 2.0
Very Stiff	16 - 30	> 2.0 to 4.0
Hard	> 30	> 4.0 or greater

Standard Penetration 'N-Value' = Blows per foot of a 140-pound hammer falling 30 inches on a 2-inch O.D. split barrel sampler, except where noted. N60 values as reported on boring logs represent raw N-values corrected for hammer efficiency only.

3/16/23 2:03:46 PM

BORING RB1

BORING DEPTH: 20 FEET

PROJECT NAME: LBWL Erickson Station | Ash Impoundments Closure **PROJECT NUMBER:** 092330.00

CLIENT: TL Contracting, Inc. **PROJECT LOCATION:** Delta Township, Michigan

DATE STARTED: 3/10/23 **COMPLETED:** 3/10/23 **BORING METHOD:** Hollow-stem Augers

DRILLER: JR/CR **RIG NO.:** 552-CME 55-Truck **LOGGED BY:** SM **CHECKED BY:** JW

LATITUDE: 42.68713
LONGITUDE: -84.65678
ELEVATION: 885.6± FT

ELEV (FT)	DEPTH (FT)	PROFILE DESCRIPTION	SAMPLE TYPE/NO.	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES
885	0				
	1.0	FILL- Fine to Coarse SAND with Silt- Brown and Dark Brown- Moist (SP-SM)	SB1		0 4 4 6
			SB2		3 4 6 5
	5	FILL- Sandy LEAN CLAY- Brown, Dark Brown, and Gray- Very Stiff to Stiff (CL)	SB3		5 5 6 8
880			SB4		6 8 8 8
	9.0	876.6	SB5		4 4 4 3
	10	Sandy LEAN CLAY- Occasional Wet Sand Seams- Brown and Gray- Stiff to Medium (CL)	SB6		3 3 3 3
875	11.5	874.1			
		LEAN CLAY with Sand- Brown- Very Stiff (CL)	SB7		5 4 4 6
	14.0	871.6			
	15	Sandy SILT- Brown- Wet- Medium Dense (ML)	SB8		6 7 7 10
870	15.0	870.6			
		Sandy LEAN CLAY- Brown to Gray at 16 feet- Hard (CL)	SB9		5 10 8 12
			SB10		9 9 10 9
	20	865.6			
865		END OF BORING AT 20.0 FEET.			
	25				
860					
	30				

HAMMER EFFICIENCY: 82%
DATE: 9/29/2022
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL)

▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

	DEPTH (FT)	ELEV (FT)
▽ **DURING BORING:**	9.5	876.1

BACKFILL METHOD: Installed Monitoring Well

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
3. Latitude, longitude & elevation obtained with a Leica GPS.

3/16/23 2:03:47 PM

BORING RB2

BORING DEPTH: 20 FEET

PROJECT NAME: LBWL Erickson Station | Ash Impoundments Closure
PROJECT NUMBER: 092330.00
CLIENT: TL Contracting, Inc.
PROJECT LOCATION: Delta Township, Michigan

DATE STARTED: 3/10/23 **COMPLETED:** 3/10/23 **BORING METHOD:** Hollow-stem Augers

DRILLER: JR/CR **RIG NO.:** 552-CME 55-Truck **LOGGED BY:** SM **CHECKED BY:** JW

LATITUDE: 42.68675
LONGITUDE: -84.65635
ELEVATION: 885.9± FT

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES
885	0	0.6 FILL- Fine to Coarse SAND with Silt- Dark Brown- Moist (SP-SM) 885.3	SB1	16	0 3 3 4
			SB2	13	2 3 4 3
	5	FILL- LEAN CLAY with Sand- Brown, Dark Brown, and Gray- Stiff (CL)	SB3	24	0 3 3 4
880			SB4	24	3 3 3 3
		9.5 876.4	SB5	24	0 3 3 4
	10	LEAN CLAY with Sand- Gray and Dark Gray- Stiff to Medium (CL)	SB6	15	4 4 5 6
875		13.0 872.9	SB7	13	1 2 1 2
	15	LEAN CLAY with Sand- Occasional Wet Sand Seams- Brown- Very Stiff to Hard (CL)	SB8	13	2 3 3 4
870			SB9	24	3 5 5 5
		20.0 865.9	SB10	24	7 6 10 9
	20	END OF BORING AT 20.0 FEET.			
865					
	25				
860					
	30				

HAMMER EFFICIENCY: 82%
DATE: 9/29/2022
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL) (10 20 30 40)

SHEAR STRENGTH (KSF) (1 2 3 4)
▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

	DEPTH (FT)	ELEV (FT)
▽ DURING BORING:	17.0	868.9

BACKFILL METHOD: Installed Monitoring Well

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
3. Latitude, longitude & elevation obtained with a Leica GPS.

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WELL OW-RB1

WELL DEPTH: 20 FEET

PROJECT NAME: LBWL Erickson Station | Ash Impoundments Closure **PROJECT NUMBER:** 092330.00

CLIENT: TL Contracting, Inc. **PROJECT LOCATION:** Delta Township, Michigan

DATE STARTED: 3/10/23 **COMPLETED:** 3/10/23 **BORING METHOD:** Hollow-stem Augers

DRILLER: JR/CR **RIG NO.:** 552-CME 55-Truck **LOGGED BY:** SM **CHECKED BY:** JW

ELEVATION: 885.6± FT

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION		
885	0			
	1.0	FILL- Fine to Coarse SAND with Silt- Brown and Dark Brown- Moist (SP-SM)	884.6	
	5	FILL- Sandy LEAN CLAY- Brown, Dark Brown, and Gray- Very Stiff to Stiff (CL)		
880	9.0		876.6	
	10	Sandy LEAN CLAY- Occasional Wet Sand Seams- Brown and Gray- Stiff to Medium (CL)		
875	11.5		874.1	
		LEAN CLAY with Sand- Brown- Very Stiff (CL)		
	14.0		871.6	
	15	Sandy SILT- Brown- Wet- Medium Dense (ML)		
870	15.0		870.6	
		Sandy LEAN CLAY- Brown to Gray at 16 feet- Hard (CL)		
	20			
865	20.0	END OF BORING AT 20.0 FEET.	865.6	
	25			
860	30			

WELL DIAGRAM

- Bentonite Chips
- 2-inch I.D. Schedule 40 PVC Riser
- 7 1/2-inch diameter borehole
- Filter Sand
- 2-inch I.D. Schedule 40 PVC Well Screen with 0.010 slot size

REMARKS

GROUNDWATER INFORMATION

	DEPTH (FT)	ELEV (FT)
▽ **DURING BORING:**	9.5	876.1

WELL WATER LEVEL DATA

DATE	DEPTH (FT)	ELEV (FT)

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.

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WELL OW-RB2

WELL DEPTH: 20 FEET

PROJECT NAME: LBWL Erickson Station | Ash Impoundments Closure **PROJECT NUMBER:** 092330.00

CLIENT: TL Contracting, Inc. **PROJECT LOCATION:** Delta Township, Michigan

DATE STARTED: 3/10/23 **COMPLETED:** 3/10/23 **BORING METHOD:** Hollow-stem Augers

DRILLER: JR/CR **RIG NO.:** 552-CME 55-Truck **LOGGED BY:** SM **CHECKED BY:** JW

ELEVATION: 885.9± FT

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION
885	0	0.6 FILL- Fine to Coarse SAND with Silt- Dark Brown- Moist (SP-SM) — 885.3
	5	FILL- LEAN CLAY with Sand- Brown, Dark Brown, and Gray- Stiff (CL)
880		9.5 — 876.4
875	10	LEAN CLAY with Sand- Gray and Dark Gray- Stiff to Medium (CL)
		13.0 — 872.9
870	15	LEAN CLAY with Sand- Occasional Wet Sand Seams- Brown- Very Stiff to Hard (CL)
	20	20.0 — 865.9
865		END OF BORING AT 20.0 FEET.
860	25	
	30	

WELL DIAGRAM

- Bentonite Chips
- 2-inch I.D. Schedule 40 PVC Riser
- 7 1/2-inch diameter borehole
- Filter Sand
- 2-inch I.D. Schedule 40 PVC Well Screen with 0.010 slot size
- Bentonite Chips

REMARKS

GROUNDWATER INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

WELL WATER LEVEL DATA

NOTES: 1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

GENERAL COMMENTS

BASIS OF GEOTECHNICAL REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practices to assist in the design and/or evaluation of this project. If the project plans, design criteria, and other project information referenced in this report and utilized by SME to prepare our recommendations are changed, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions and recommendations of this report are modified or approved in writing by our office.

The discussions and recommendations submitted in this report are based on the available project information, described in this report, and the geotechnical data obtained from the field exploration at the locations indicated in the report. Variations in the soil and groundwater conditions commonly occur between or away from sampling locations. The nature and extent of the variations may not become evident until the time of construction. If significant variations are observed during construction, SME should be contacted to reevaluate the recommendations of this report. SME should be retained to continue our services through construction to observe and evaluate the actual subsurface conditions relative to the recommendations made in this report.

In the process of obtaining and testing samples and preparing this report, procedures are followed that represent reasonable and accepted practice in the field of soil and foundation engineering. Specifically, field logs are prepared during the field exploration that describe field occurrences, sampling locations, and other information. Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory and differences may exist between the field logs and the report logs. The engineer preparing the report reviews the field logs, laboratory classifications, and test data and then prepares the report logs. Our recommendations are based on the contents of the report logs and the information contained therein.

REVIEW OF DESIGN DETAILS, PLANS, AND SPECIFICATIONS

SME should be retained to review the design details, project plans, and specifications to verify those documents are consistent with the recommendations contained in this report.

REVIEW OF REPORT INFORMATION WITH PROJECT TEAM

Implementation of our recommendations may affect the design, construction, and performance of the proposed improvements, along with the potential inherent risks involved with the proposed construction. The client and key members of the design team, including SME, should discuss the issues covered in this report so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk, and expectations for performance and maintenance.

FIELD VERIFICATION OF GEOTECHNICAL CONDITIONS

SME should be retained to verify the recommendations of this report are properly implemented during construction. This may avoid misinterpretation of our recommendations by other parties and will allow us to review and modify our recommendations if variations in the site subsurface conditions are encountered.

PROJECT INFORMATION FOR CONTRACTOR

This report and any future addenda or other reports regarding this site should be made available to prospective contractors prior to submitting their proposals for their information only and to supply them with facts relative to the subsurface evaluation and laboratory test results. If the selected contractor encounters subsurface conditions during construction, which differ from those presented in this report, the contractor should promptly describe the nature and extent of the differing conditions in writing and SME should be notified so that we can verify those conditions. The construction contract should include provisions for dealing with differing conditions and contingency funds should be reserved for potential problems during earthwork and foundation construction. We would be pleased to assist you in developing the contract provisions based on our experience.

The contractor should be prepared to handle environmental conditions encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers. Any Environmental Assessment reports prepared for this site should be made available for review by bidders and the successful contractor.

THIRD PARTY RELIANCE/REUSE OF THIS REPORT

This report has been prepared solely for the use of our Client for the project specifically described in this report. This report cannot be relied upon by other parties not involved in the project, unless specifically allowed by SME in writing. SME also is not responsible for the interpretation by other parties of the geotechnical data and the recommendations provided herein.

LABORATORY TESTING PROCEDURES

VISUAL ENGINEERING CLASSIFICATION

Visual classification was performed on recovered samples. The appended General Notes and Unified Soil Classification System (USCS) sheets include a brief summary of the general method used visually classify the soil and assign an appropriate USCS group symbol. The estimated group symbol, according to the USCS, is shown in parentheses following the textural description of the various strata on the boring logs appended to this report. The soil descriptions developed from visual classifications are sometimes modified to reflect the results of laboratory testing.

MOISTURE CONTENT

Moisture content tests were performed by weighing samples from the field at their in-situ moisture condition. These samples were then dried at a constant temperature (approximately 110º C) overnight in an oven. After drying, the samples were weighed to determine the dry weight of the sample and the weight of the water that was expelled during drying. The moisture content of the specimen is expressed as a percent and is the weight of the water compared to the dry weight of the specimen.

HAND PENETROMETER TESTS

In the hand penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small calibrated, spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square-foot (tsf). Theoretically, the undrained shear strength of the cohesive sample is one-half the unconfined compressive strength. The undrained shear strength (based on the hand penetrometer test) presented on the boring logs is reported in units of kips per square-foot (ksf).

TORVANE SHEAR TESTS

In the Torvane test, the shear strength of a low strength, cohesive soil sample is estimated by measuring the resistance of the sample to a torque applied through vanes inserted into the sample. The undrained shear strength of the samples is measured from the maximum torque required to shear the sample and is reported in units of kips per square-foot (ksf).

LOSS-ON-IGNITION (ORGANIC CONTENT) TESTS

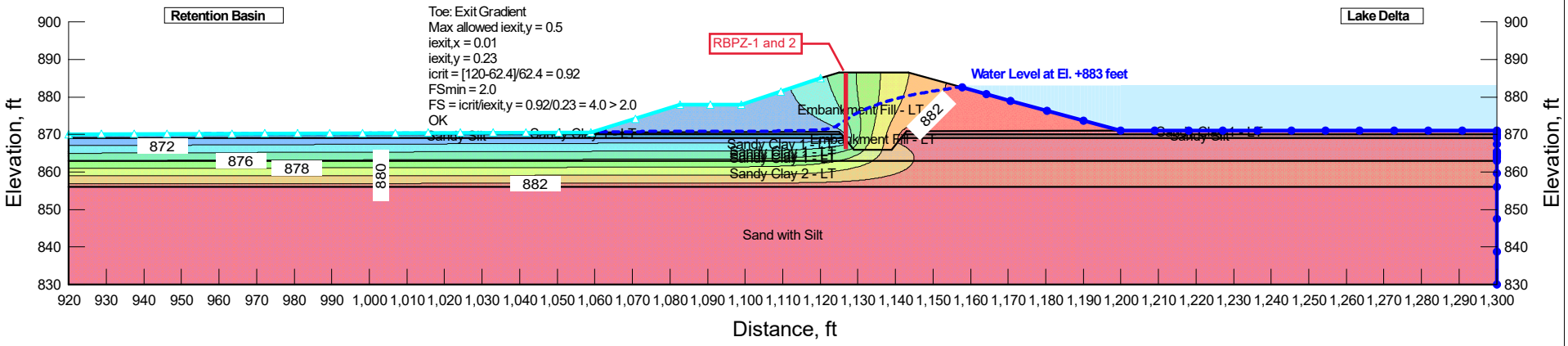
Loss-on-ignition (LOI) tests are conducted by first weighing the sample and then heating the sample to dry the moisture from the sample (in the same manner as determining the moisture content of the soil). The sample is then re-weighed to determine the dry weight and then heated for 4 hours in a muffle furnace at a high temperature (approximately 440º C). After cooling, the sample is re-weighed to calculate the amount of ash remaining, which in turn is used to determine the amount of organic matter burned from the original dry sample. The organic matter content of the specimen is expressed as a percent compared to the dry weight of the sample.

ATTERBERG LIMITS TESTS

Atterberg limits tests consist of two components. The plastic limit of a cohesive sample is determined by rolling the sample into a thread and the plastic limit is the moisture content where a 1/8-inch thread begins to crumble. The liquid limit is determined by placing a ½-inch thick soil pat into the liquid limits cup and using a grooving tool to divide the soil pat in half. The cup is then tapped on the base of the liquid limits device using a crank handle. The number of drops of the cup to close the gap formed by the grooving tool ½ inch is recorded along with the corresponding moisture content of the sample. This procedure is repeated several times at different moisture contents and a graph of moisture content and the corresponding number of blows is plotted. The liquid limit is defined as the moisture content at a nominal 25 drops of the cup. From this test, the plasticity index can be determined by subtracting the plastic limit from the liquid limit.

Attachment B
SEEP/W Output for Retention Basin

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/psf)
	Embankment Fill - LT	Saturated Only	3.28e-09	1	0	0	4.79e-07
	Sand with Silt	Saturated Only	6.56e-05	1	0	0	4.79e-07
	Sandy Clay 1 - LT	Saturated Only	1.31e-08	0.25	0	0	4.79e-07
	Sandy Clay 2 - LT	Saturated Only	1.31e-08	0.25	0	0	4.79e-07
	Sandy Silt	Saturated Only	6.56e-05	1	0	0	4.79e-07



Project Name: Structural Stability and Safety Factor Assessment
Client: Lansing Board of Water & Light
Analysis: Retention Basin, Section A-A with Groundwater Pumping Well
Project Location: Lansing, Michigan